This is a reproduction of a library book that was digitized by Google as part of an ongoing effort to preserve the information in books and make it universally accessible.

Google™ books

https://books.google.com

UNIVERSITY OF CALIFORNIA, SANTA CRUZ
3 2106 02096 2749

AFRICA PILOT
VOL. III

COMPRISING
THE SOUTHERN AND EASTERN COASTS OF AFRICA
FROM
TABLE BAY TO RAS HAFUN

ELEVENTH EDITION
1954

CAUTION

ATTENTION IS CALLED TO ADMIRALTY NOTICES TO MARINERS NOS. 1-20 OF THE CURRENT YEAR WHICH CONTAIN THE FOLLOWING INFORMATION :—

LIBRARY
UNIVERSITY OF
CALIFORNIA
SANTA CRUZ

N.M. No. 1 CAUTION WHEN APPROACHING BRITISH AND COMMONWEALTH PORTS.
- Part I Closing of Ports ; Stopping of Movements in Ports.
- Part II Examination Service.
- Part III Other Regulations in force.

No. 2 NOTICE TO ALL MARINERS, SHIPOWNERS AND OTHERS CONCERNED.—AGENTS FOR SALE OF CHARTS AND HYDROGRAPHIC PUBLICATIONS.

No. BRITISH

52261

No. MER-
S.

No. HANT

No.

No. REAS.

No. , 1931.

No 'S AP-
CRAFT

No E THE

No NINGS,
GREAT

N

N SIGNAL

527.51
:45
:70
v.3
11th ed.
1954

IONAL

PORTS

ty Charts.

ECHO

MINES :

RAPHIC

AINING

Copies of these Notic [illegible] *Masters of ships from Mercantile Marine Offices in the* [illegible] *y also be inspected at Dominion, Indian and Colon* [illegible] *es and at British Consulates.*

Ps. 8980. Wt. 21904/E [illegible] 0.

NOTATIONS OF SUPPLEMENTS AND ANNUAL SUMMARIES OF NOTICES TO MARINERS RELATING TO THIS BOOK.

To be filled in by Navigating Officer.

(In Chart Depôts the first two columns are alone to be filled up.)

Title.	Date of Publication and Number.	Date of insertion of Note in Margins of Book.

WITHDRAWN from

NOTICE.

This volume should not be used without reference to the latest Supplement and Annual Summary of Notices to Mariners affecting it which may have been published.

A Supplement to this volume will generally be published annually until the latter is again taken up for revision.

After the publication of Supplement No. 1, each succeeding supplement cancels the former.

Between the time of the volume being taken up for revision and the publication of the new edition no supplement will be issued, but early in each year a Summary of the Admiralty Notices to Mariners affecting the volume, which have been published during the preceding year, will be issued as a separate publication.

The publication of all Supplements and Summaries of Notices to Mariners is announced in Admiralty Notices to Mariners.

The latest Supplement and any Annual Summary of Notices to Mariners that has been published affecting this volume will be obtainable gratuitously by purchasers of this volume from the Agents for the sale of Admiralty charts and other Hydrographic publications, on application either personally or by letter; in the latter case the cost of postage must be enclosed. For a list of these Agents *see* Admiralty Notice to Mariners No. 2, published annually.

AFRICA PILOT

VOLUME III

COMPRISING
THE SOUTHERN AND EASTERN COASTS OF AFRICA
FROM
TABLE BAY TO RAS HAFUN

ELEVENTH EDITION, 1954

Crown Copyright Reserved

LONDON
PUBLISHED by the HYDROGRAPHIC DEPARTMENT, ADMIRALTY

To be obtained from
the Agents for the Sale of Admiralty Charts, etc.

1954

Price Seventeen Shillings and Sixpence Net

WITHDRAWN from LIBRARY, USC&GS

VK
877
G7
1954
v.3

52261
APR 5 1955

To face page ii.]

CAUTION.

IN THIS WORK THE BEARINGS ARE REFERRED TO THE TRUE COMPASS, AND WHEN GIVEN IN DEGREES ARE RECKONED CLOCKWISE, FROM 000° (NORTH) TO 359°.

THE BEARINGS OF LIGHTS ARE GIVEN FROM SEAWARD.

THE LATITUDES AND LONGITUDES GIVEN IN THE TEXT ARE APPROXIMATE.

THE DISTANCES ARE EXPRESSED IN SEA-MILES OF 60 TO A DEGREE OF LATITUDE.

A CABLE'S LENGTH IS ASSUMED TO BE EQUAL TO THE TENTH PART OF A SEA-MILE. IT IS OFTEN ACCEPTED AS BEING ONE-TENTH OF A NAUTICAL MILE.

THE DEPTHS ARE GIVEN BELOW CHART DATUM LEVEL WHERE NOT OTHERWISE STATED.

HEIGHTS ON THE LAND ARE GIVEN ABOVE MEAN LEVEL OF HIGH WATER SPRING TIDES.

FIGURES IN BRACKETS GIVEN AFTER THOSE DENOTING FEET, FATHOMS AND YARDS ARE THEIR EQUIVALENTS IN METRES.

TIME IS EXPRESSED IN THE FOUR-FIGURE NOTATION COMMENCING AT MIDNIGHT.

THE TERM "POWER VESSEL" USED HEREIN INCLUDES ANY VESSEL PROPELLED BY MACHINERY.

A NAME IN BRACKETS, IMMEDIATELY FOLLOWING ANOTHER NAME, IS THE OBSOLETE NAME WHICH IS STILL SHOWN ON THE ADMIRALTY CHARTS. AS A GENERAL RULE, THE BRACKETED NAME IS ONLY INSERTED IN THE DESCRIPTION OF THE PLACE OR OBJECT PREVIOUSLY BEARING THAT NAME.

WHEN SHADING IS USED TO INDICATE COLOURS OF FLAGS, TIDAL LIGHT SIGNALS, OR BEACONS, IT IS AS FOLLOWS:

⠿	▥	▤	▧	■
Yellow.	Red.	Blue.	Green.	Black.

ADVERTISEMENT TO THE ELEVENTH EDITION

Africa Pilot, Volume III, contains Sailing Directions for the southern and eastern coasts of Africa from Table bay to Ras Hafun.

This, the eleventh edition, has been prepared by Commander H. P. L. Tennent, Royal Navy, and contains the latest information received in the Hydrographic Department.

The meteorological and ocean currents information has been revised by the Meteorological Office of the Air Ministry. Temperature is expressed in degrees Fahrenheit, rainfall in inches, speed in knots, and distance in sea miles unless expressly stated otherwise. Information received from meteorological services which do not use these units, has been converted into the units mentioned above by the Meteorological Office.

Mariners and others are invited, in the interests of navigation, to forward to the Hydrographer of the Navy, Admiralty, Oxgate Lane, Cricklewood, London, N.W.2, any information that may come under their notice which would be useful for the correction of the charts and other hydrographic publications issued by the British Admiralty ; *early* advice as to newly-discovered dangers, the establishment of, or changes in, any aids to navigation, is specially requested.

Copies of a form (H. 102), on which to render information, can be obtained *gratis* from the Hydrographer of the Navy, Hydrographic Supplies Establishment, Creechbarrow House, Taunton, Somerset, or from any of the Admiralty Chart Agents in Great Britain and abroad, a list of whom is published annually, in Admiralty Notice to Mariners No. 2.

By the publication of this volume, the tenth edition of the Africa Pilot, Part III, and its Supplement No. 8, 1952, are cancelled, and all information affecting that work, contained in Notices to Mariners up to and including No. 83 of 1954, has been embodied in this volume. For temporary and preliminary Notices to Mariners affecting this edition, the list of temporary and preliminary Notices to Mariners in force, published monthly in the weekly edition of the Admiralty Notices to Mariners, should be consulted.

A. DAY,
Vice-Admiral,
Hydrographer of the Navy.

Hydrographic Department,
Admiralty, London,
8th January, 1954.

BIBLIOGRAPHY

The following books, etc., other than British Government publications, have been consulted in the preparation of this edition :—

BRITISH.

The Statesman's Year Book, 1953.
Whitaker's Almanack, 1953.
Year Book and Guide to Southern Africa, 1951.
Year Book and Guide to East Africa, 1951.
Ports of the World, 1953.

PORTUGUESE.

Lista de Faróis, 1949, with Supplement No. 3, 1952.

ITALIAN.

Portalano della Somalia Italiano, 1936 } Instituto Idrografico
Elenco dei Fari, etc Parte II, 1953 } della Marina, Genova.

CONTENTS

Page
Caution . . . . *facing* ii
Advertisement iii
Bibliography iv
Contents . . . . v–vi
List of views . . . . vii–viii
Glossary of foreign words ix
System of Orthography xi
Laws and Regulations appertaining to Navigation . xv
Information relating to Admiralty Charts and publications, general navigation and general meteorology . . xv
Index Chart . . . . *facing* 1

CHAPTER I

General remarks—Union of South Africa—Portuguese East Africa or Moçambique—Tanganyika Territory—Zanzibar Protectorate—Kenya Colony and Protectorate—Somalia—Currents—Tidal streams—Ice—Signals—Life-saving—Local Magnetic Anomalies—Air lights—Submarine cables—Buoyage—Pilotage—Communications—Standard and summer times—Fuel—Repairs—British Consular officers—Regulations—Quarantine—Deratisation—Passages—Climate and Weather—Climatic tables 1–80

CHAPTER II

Table bay to Cape Agulhas 81–106

CHAPTER III

Cape Agulhas to Woody cape, including Port Elizabeth and Bird islands 107–139

CHAPTER IV

Woody cape to Waterfall bluff 140–170

CHAPTER V

Waterfall bluff to Ponta da Barra 171–215

Page

CHAPTER VI

Moçambique channel—Ponta da Barra to Ponta Tangalane 216–246

CHAPTER VII

Moçambique channel—Ponta Tangalane to Cabo Delgado 247–303

CHAPTER VIII

Cabo Delgado to Ras Ndege, including Mto Rufiji and Mafia island and channel 304–349

CHAPTER IX

Ras Ndege to Pangani bay, including Zanzibar channel and island 350–392

CHAPTER X

Pangani bay to Ras Ngomeni, including Pemba channel and island 393–452

CHAPTER XI

Ras Ngomeni to Fiume Giuba entrance 453–481

CHAPTER XII

Fiume Giuba entrance to Ras Hafun 482–508

APPENDICES

I.—Simons bay Dockyard port regulations . . 509–510
II.—List of ports available for under-water repairs . 511–513
III.—List of principal ports, giving particulars of depths, etc. 514
IV.—Places suitable for magnetic observations . . 515–518

Index 519–551

LIST OF VIEWS

On or facing page
Cape peninsula, Northern end of, from northward . . 82
Cape peninsula, Northern end of, from westward . . . 82
Cape peninsula, Northern end of, from westward . . . 83
Slangkop point and adjacent coast 83
Cape point lighthouse, from northward 92
Slangkop point lighthouse 92
Cape of Good Hope, from south-westward 93
Cape of Good Hope, from eastward 93
Simons bay 93
Cape Hangklip and Danger point, coast between . . . 102
Cape Hangklip and Danger point, coast between . . . 103
Quoin point to Gunner's Quoin 114
Cape Agulhas and coast in vicinity from westward . . 114
Cradock berg and the Outeniqua mountains 115
Formosa peak and Karreedouwsberg, coast between . . 115
Cape St. Francis, coast in vicinity of 115
Woody cape and Glendower peak, coast between . . . 148
Cape Morgan and Mazeppa bay, coast between . . . 149
Bashee river, approaches to 162
Port St. John's, entrance to 163
Inhaca lighthouse 196
Monte Cutfield beacon 197
Farol de Vasconcelas e Sá 197
Ponta dos Elefantes beacon 199
Cape St. Lucia, approach to, from north-north-eastward . 200
Vidal peak from north-eastward 200
Lagoa river entrance from south-eastward 201
Monte Cutfield from south-eastward 201
Xefina light-structure 200
Ponta Vermelha old light-tower 201
Baixo Ribeiro light-structure 201
Catembe front leading light-structure 204
Catembe rear leading light-tower 204
Monte Belo lighthouse 210
Boa Paz lighthouse 212
Quissicö light-tower 213
Ponta Zavora lighthouse 213
Ponta da Barra lighthouse 215
Bazaruto lighthouse 222
Ponta Macuti lighthouse 228
Bocas do Zambeze lighthouse 233
Vilhena light-structure 243
Ponta Matirre lighthouse 249

	On or facing page
Ilha do Fogo light-structure	252
Ponta Caldeira lighthouse	256
Ilha de Mafamede lighthouse	257
Sangage lighthouse	259
Ponta Namalungo light-structure	260
Ilha de Goa lighthouse	264
Pinda lighthouse	276
Ponta Uifondo light-structure	281
Ponta Maunhane light-tower	281
Ibo lighthouse	286
Tambúzi light-structure	294
Cabo Delgado lighthouse	302
Mto Sudi from north-eastward	316
Kiswere from northward	316
Fungu Kizimkazi from westward	349
Ras Nungwi lighthouse	380
Moa or Gomani bay from eastward	421
Ras Serani leading lights	432
Shella lighthouse	458
Sabda Badda from south-eastward	484
Brava rear leading beacon	485
Sheik Osman mosque	488
Merca rear leading light-tower	489
Gonderscia and Oriale	491
Mogadiscio lighthouse	492
Uarsciech rear leading beacon	495
Bur el Harion beacon	497
Massaua beacon	498
Ras Assuad from south-eastward	499
Ras Assuad from north-eastward	499
Obbia, coast close southward	502
Obbia, coast about 60 miles north-eastward	502
Ras el Cheil from eastward	503
Wadi Nogal, mouth of, from south-eastward	503
Ras Mabber from south-eastward	503

GLOSSARY

OF FOREIGN WORDS USED IN THE CHARTS AND SAILING DIRECTIONS BETWEEN THE MOUTH OF THE KOSI RIVER AND RAS HAFUN

English.	*Portuguese.*	*Italian.*	*Arabic or Swahili.*
Bank	Banco	Banco	Fungu
Bar	Barra		
Bay, Bight	Baia, Enseada	Baia	
Cape	Cabo	Capo	Ras
Castle		Castello	Geneza, Ngome
Channel	Canal	Canale	Mlango
Coast			Pwani
Creek		Cor	Mto, Khor
Fort	Fortaleza, Forte		
Hill		Collina	Kilima
Island	Ilha	Isola	Kisiwa
Islet	Ilheu	Isolotto	
Lagoon	Laguna		
Lake	Lago, Lagoa		
Mountain	Monte		Mlima
Mouth of river	Foz, Bôca		
Passage, Pass	Passagem	Passo	
Peninsula		Penisola	
Point	Ponta	Punta	Ras
Port, Harbour	Porto	Porto	Bandar, Bender
Range	Serra		
River	Rio	Fiume	Mto, Wadi
Rock	Pedra	Scoglio	
Rocky ledge	Parcel		
Shoal	Baixo	Secca	Mwamba
Shoal spit	Restinga		
Tower	Torre	Torre	Mnara
Village	Vila, Villa	Villaggio	

SYSTEM OF ORTHOGRAPHY

The following rules for the spelling of geographical names (termed the R.G.S. II system) have been adopted for British official use, and the names in Admiralty Hydrographic publications will be rendered in accordance with these rules as opportunity occurs.

In new editions of the various volumes of sailing directions names are, generally speaking, given in accordance with these rules, but where the name on the chart shows an older rendering of a name, such chart name is given in brackets after the new rendering and will also be given in the Index.

The rules for spelling in the R.G.S. II system are as follows:—

(1) The spelling of every place-name in an independent country or self-governing dominion using the Roman alphabet (including " Roman " alphabets containing extra or modified letters, such as Czech, Serb-Croat, Polish, Romanian, etc.) shall be that adopted by the country or dominion.

(2) In colonial possessions the spelling of such place-names as belong to languages coming under Rule (1) will be spelt in accordance with that rule.

(3) The accents and diacritical marks in official use by the above countries will be retained. Wherever it appears desirable, the pronunciation will be shown by giving the name as transliterated on the system below.

(4) All other place-names throughout the world will be spelled in general accordance with the following system.

The broad features of this system are

(*a*) That vowels are pronounced as in Italian and consonants as in English:

(*b*) That every letter is pronounced, and no redundant letters are used.

This system aims at giving a close approximation to the *local* pronunciation; but it is recognised that in some languages, notably Russian, Greek, and Arabic, the necessity for letter-for-letter transliteration often renders this impossible.

TABLE OF SPELLING AND PRONUNCIATION R.G.S. II.

a	The long and short Italian vowels, as in *lāvă*	Somāli; Răvennă.*
ä	Between *a* in *fat* and *e* in *eh*?; chiefly in Teutonic and Finno-Ugrian languages	Mähring; Pärnu.
ai	The two Italian vowels, frequently diphthongal, almost as in *aisle*; but pronounced *ei* and *ē* in Greek names	Wadai; Shanghai.
au	The two Italian vowels; frequently diphthongal; almost as *ou* in *out*	Sakau; Bauchi.
aw	When followed by a consonant, or when terminal, as in *awl, law*	Dawna; Saginaw.
b	As in English.	
c	Not to be used, but always replaced by *k* or *s*; except in the compound *ch*, and in many conventionally-spelt words, as	Kandahar; Serang. Calcutta; Celébes.
ch	As in *church*; never *tch* or *tsch* for this sound	Chad; Kerch.
d‡	As in English.	
dh	Soft *th* as in *they*; a slight *d* sound sometimes preceding it in Semitic languages	Hadhramaut; Riyadh.
e	Long as in *eh*? short as in *bet*. (For the *e* sound in the French *je*, see note at end on the "neutral vowel.")	Gēlo; Mafĕking.*
(ee)	Used for *i* (*q.v.*) only in a few conventional names	Darjeeling; Keelung.
ei	The two Italian vowels, frequently diphthongal as in *rein*, but pronounced *i* in Greek names	Beirut; Raheita.
(eu)	Not used as a single sound.	
f	As in English; *ph* must not be used for this sound	Mustafa; Maidan-i-Naftun.
g	Hard, as in *get, gift*: never as in *gem, gin*	Gedáref; Gilgit.
gh	Soft guttural, the Arabic *ghain*	Ghadames; Baghdad.
h	Used only when sounded; or in the compounds *ch, dh, gh, kh, sh, th, zh*	Ahmadabad; 'Abdullah.
i	Long as in *marine*; short as in *piano*	Fiji; Kibonde.
	As in English; except in transcription of Chinese, where it equals *zh*, or the French *j*	Juba, Ujiji (Eng. *j*); but Jaoping (Fr. *j*).
k	As in English; hard *c* should never be used (except in conventionally-spelt words)—thus, not Corea, Cabul, but	Korea; Kabul.
kh	Hard aspirated guttural, as in the Scottish *loch* (not as in *lock*)	Khan; Sebkha.
l‡ **m** **n**‡	As in English.	

*The long and short symbols given here are merely for explanation, not for use.

‡See note at end on *Liquid Sounds*.

ng	Has three separate sounds, as in *vanguard, finger,* and *singer*. If necessary to distinguish, a hyphen may be placed, as in *van-guard, singer-* ..	In-galla; Bongo; Ng-ami; Tong-a.
ngg	May be used for the sound of *ng* as in *finger* ..	Trengganu; Yanggang-a.
o	Long as in *both*¶: short as in *rotund*	Kigōma; Hŏnŏlulu.*
ö	As in German; equals the French *eu* in *peu*; or nearly the English sound in *fur*	Barköl.
(oo)	Used for *u* (*q.v.*) only in a few conventional names, chiefly Indian and Chinese	Poona; Foochow.
oi	The two Italian vowels; frequently diphthongal as in *oil*, but pronounced like *i* in *fit* in Greek names	Hanoi.
öi	The diphthong as in French *oeil* and Norwegian *höi*	Höiland.
ou	Dissyllabic, and not as French or English *ou*, except in Greek names where it has the French value	Zlatoust; Yaroua.
ow	Used as a diphthongal combination of *ō* and *w* only in the romanisation of Chinese	Hankow.
p	As in English.	
ph	As in *loophole*; not to be used for the *f*-sound, except conventionally	Chemulpho; Haiphong.
q	Represents *only* the Arabic *qaf* and the Hebrew *qof*; i.e. a guttural *k* (as a rule)	Qena; Qiryath.
qu	Should never be employed to represent the sound of *kw*; thus, not Namaqua, Quorra, but	Namakwa; Kworra.
r	As in English; should be distinctly pronounced.	
s‡	As English *ss* in *boss*, not as in *these* or *pleasure*	Burgos; Masikesi.
sch	As in *discharge*	Peschanka.
sh **t‡**	As in English.	
th	Hard *th* as in *thick*, not as in *this* (except conventionally in Fijian)	'Athlith; Thingvellir.
u	Long as in *rude*, or as *oo* in *boot*; short as in *pull*	Zūlū; Rŭanda.*
ü	As in German: equals the French *u*, as in *tu* (Fr.)	Üsküdar.
v **w** **x**	As in English.	
y	Always a consonant, as in *yard*; it should not be used as a terminal vowel, *e* or *i* being substituted; e.g. not Kwaly or Wady, but	Kikuyu; Maya. Kwale; Wadi.
z	As in *gaze*, not as in *azure*.	
zh	As the *s* in *treasure*, the *z* in *azure*, or the French *j* in *je*; but for the sound in Chinese use *j* (*vide* note under *j*)	Zhob.

*The long and short symbols given here are merely for explanation, not for use.
‡See note at end on *Liquid sounds*.
¶The true Italian ō is broader than this; almost as in *broth* (= R.G.S. II *aw*). The letter *o* is conventionally used for this sound in certain names in Nigeria. Tonga, etc.: e.g. Oyo, Fofoa.

NOTES.

The doubling of a vowel or a consonant is only necessary when there is a distinct repetition of the single sound, and should otherwise be avoided	Nuusafee; Moorea; Jidda; Muhammad.
Accents should not generally be employed; but in order to indicate or emphasise the stress, an acute accent may be used	Saráwak; Qántara; Tong-atábu; Paraná.
A long or short mark over a vowel (e.g. ā, ŏ) should only be used (and that sparingly) when without it there would be danger of mispronunciation ..	Kūt; Kyōto; Abŏso.
Hyphens will not be used except to indicate pronunciation and with the particle *-i-* (in Persian, Fijian, etc.)	Ta-if; Pusht-i-Kuh; Nuku-i-Ra.

Inverted comma and apostrophe.—The inverted comma ' is employed only to represent the Arabic *'ain*, the Maltese *'ghain*, and the Hebrew *'ayin*. The apostrophe ' in foreign words indicates a liquid sound (*see* below).

Liquid sounds.—The occasional "liquid" or "palatalised" sound of *d*, *l*, *n*, *s*, *t*, etc. (as in *d'you*, *lure*, *new*, *pursue*, *tune*, etc.) is as a rule sufficiently represented by a following *y*; where, however, owing to a following consonant, or to the palatalised letter coming at the end of a word, the *y* is inapplicable, the liquid sound will be represented by an apostrophe, thus: *d'*, *l'*, *n'*, *s'*, *t'*, etc.

The "Neutral vowel."—The "indeterminate" or "neutral" vowel sound (*er*), i.e. the sound of *a* in *marine*, *e* in *often*, *i* in *stir*, *io* in *nation*, *ò* in *connect*, *ou* in *curious*, *u* in *difficult*, etc., *e* in French *je*, or the often unwritten vowel (*Fat-ha*) in Arabic, etc., is represented as a rule by *a*: as in Basra, Hawiya; but sometimes by *e*, when the sound approximates more to *e* than to *a*: as Meshed, El Gezira.

(In any guide to pronunciation issued by the Permanent Committee on Geographical Names, the "neutral vowel" is represented generally by the italic *e*: occasionally also by italic *a* or *u*.)

This sound must not be confused with *e-mute*, where the *e* is not sounded at all: as in Abbeville.

Nasal vowels.—In illustrating the pronunciation of French, Portuguese, Polish, etc., nasal vowels, the nasalisation will be represented by italic *n*; as Czestochowa pr. Chā*n*stokhóva.

Note.—The Royal Geographical Society has published a book entitled "Alphabets of Foreign Languages transcribed into English according to the R.G.S. II system." This book enables the correct rendering of names to be obtained, also of names in languages which are transliterated letter for letter.

LAWS AND REGULATIONS APPERTAINING TO NAVIGATION.

While, in the interests of the safety of shipping, the Admiralty make every endeavour to include in their hydrographic publications details of the laws and regulations of all countries appertaining to navigation, it must be clearly understood :—

(*a*) *that no liability whatever can be accepted for failure to publish details of any particular law or regulation, and*

(*b*) *that publication of the details of a law or regulation is solely for the safety and convenience of shipping and implies no recognition of the international validity of the law or regulation.*

INFORMATION RELATING TO ADMIRALTY CHARTS AND PUBLICATIONS, GENERAL NAVIGATION, AND GENERAL METEOROLOGY.

ON THE CORRECTION OF ADMIRALTY CHARTS.

Guides to Navigation.—In addition to the charts, the navigational publications which are primarily affected by the continual changes and alterations that take place are the Admiralty Sailing Directions, the Admiralty List of Lights, Fog Signals and Visual Time Signals, and the Admiralty List of Radio Signals. The Admiralty Notices to Mariners contain information mainly for the correction of the charts and navigational publications.

CHARTS.

1. Degree of Reliance.—It should be clearly understood that the value of a chart depends on the character of the original survey and on the completeness of the reports of subsequent changes. The remarks on " The Use of Charts as Navigational Aids, &c." which are subjoined should be carefully studied in this connection.

2. System of Dating and Issue of Corrected Copies.—Admiralty charts after first publication are kept corrected by means of new editions, large corrections, and small corrections. Copies of charts issued by the Hydrographic Supplies Establishment, Admiralty Chart Agents or Admiralty Chart Depôts are corrected, except from temporary and preliminary Notices to Mariners, for all navigational information to the date of issue.

New Charts.—The date of publication of a chart is shown outside the bottom margin, in the middle, e.g. :—

Published at the Admiralty 30th May, 1947.

New Editions.—When a chart is revised throughout and modernised in style a new edition is published, the date being shown outside the bottom margin and to the right of the date of publication, e.g. :—

New Edition 2nd Jany., 1947.

All large and small corrections notations are at the same time erased, and all old copies of the charts are cancelled.

Large Corrections.—When a chart is corrected from important information which is too comprehensive to promulgate by Admiralty Notice to Mariners or to insert conveniently by hand on existing copies, but when the chart is not revised throughout, the date on which these corrections are made is shown on the chart outside the bottom margin and to the right of the date of publication, and in the case of a chart already marked with a new edition date, below such date, e.g. :—

Large corrections 10th Feb., 1947.

All small corrections notations are at the same time erased, and all copies of the chart are cancelled.

Small corrections.—

(*i*) When a chart is corrected from the information promulgated in an Admiralty Notice to Mariners (except temporary and preliminary Notices), the year, if not already shown, and number of the notice are entered in the bottom left-hand corner of the chart, e.g. :—

Small corrections 1947–*903.*

Copies of the chart stocked by the Hydrographic Supplies Establishment, Admiralty Chart Agents and the Admiralty Chart Depôts are corrected by hand from such information.

(*ii*) Prior to 1954, when a chart was corrected from information which was considered of no importance from the standpoint of safe navigation, and which was, therefore, not promulgated in an Admiralty Notice to Mariners, the year, if not already shown, and date of the correction were entered on the chart, in one of two ways, in the bottom left-hand corner below the margin and in sequence, with the notations referred to in the preceding paragraph, e.g. :—

Small corrections, 1947—$\boxed{5.20}$—

or Small corrections 1947—(VI.*25*)

These indicated that the chart plate received minor corrections on the 20th May or 25th June, respectively, which would appear on later printings.

In such cases copies of the chart held by ships and establishments were not usually replaced by new copies, but in exceptional cases, e.g., when new compasses were inserted, new copies of the charts might be supplied. It should, however, be particularly noted that the absence of corrections represented by square or bracket dates from a chart did not invalidate it for navigation.

(*iii*) Since 1954, in order that more attention may be given to New Editions, Large Corrections and corrections by Notices to Mariners, and for other reasons, the making of minor corrections to Chart plates as in (*ii*) has been discontinued. Information of no importance to safe and convenient navigation is instead recorded for inclusion in the next New Edition or Large Correction ; or, for promulgation, in a later Notice to Mariners should a change of circumstance alter the importance of the information.

In consequence, the small correction date enclosed in a rectangle does not appear later than 1953 on navigational charts. The date within brackets may still appear and is then an indication that magnetic compasses have been corrected for a change in variation.

3. Correction of Charts in Ships.—All small but important corrections affecting navigation that can be made to the charts by hand are promulgated in Admiralty Notices to Mariners and, with the exception of corrections from temporary or preliminary Notices, should at once be neatly made in waterproof violet ink on the charts affected, the year (if not already shown) and numbers of the notices being inserted, also in waterproof violet ink, in the bottom left-hand corner of the chart. The recognised abbreviations shown on Admiralty chart No. 5011 ("Signs and abbreviations used on Admiralty Charts") should be used.

Generally speaking, the amount of information which should be inserted on a chart should be in accordance with that already shown.

On large scale charts, the abridged descriptions, as shown on chart No. 5011, of all details of all lights, light-buoys and fog signals, and the year dates of obstructions, reported shoals, dredged channels, depth on bars or in shifting channels, and irregularities of lights, should be inserted.

On coastal charts, the abridged descriptions of only the principal lights and fog-signals, i.e., those to assist in approaching or making the land, should be inserted.

Particulars of such lights should be omitted, in the following order, as the scale of the chart decreases, viz.:—

(i) Elevation, (ii) Period, (iii) Number in Group, and (iv) Visibility.

Particulars of fog signals should be inserted in their appropriate positions if space permits, but should otherwise be entered in a tabulated list under the title or some other convenient place on the chart.

Inner harbour light-buoys and beacons should not be inserted on coastal charts, and against other light-buoys only the character of the light should be inserted.

On ocean charts, lights which are visible 15 miles or over should alone be inserted and then only their character and colour.

On all charts, writing should be inserted as much as possible clear of the water, unless the relative objects are on the water, and care should be taken not to obliterate any information already on the chart. When cautionary or tidal notes, &c., are inserted, they should be written in a convenient but *conspicuous* place, preferably near the title, where they will not interfere with other details.

Erasures should never be made but the details should, when necessary, be crossed through in waterproof violet ink.

Admiralty Notices to Mariners are occasionally accompanied by reproductions of portions of charts (known as "blocks"), and when correcting charts from such blocks the following points should be borne in mind:—

(i) A block may not only indicate the insertion of new information, *but also the omission of matter previously shown.* The latter would, however, invariably be mentioned in the text of the Notice, and the fact that a block accompanies a Notice should not cause the text of the Notice to be disregarded.

(ii) The limiting lines of a block are determined for convenience of reproduction and need not be adhered to when cutting out for pasting on the chart, provided that the point mentioned in the preceding paragraph is taken into consideration.

(iii) The new information shown on a block can sometimes be inserted on the chart by hand, the reason for issuing a block in such a case being to avoid a long description of the new information in the text of the Notice.

(iv) Owing to distortion the blocks do not always fit the charts exactly, care should therefore be taken when pasting a block on to a chart that the more important navigational corrections fit as closely as possible. This can best be assured by fitting the block while it is dry and making two or three pencil ticks round the edges for use as fitting marks after the paste is applied.

Corrections from Temporary or Preliminary Notices to Mariners should be inserted on the charts *in pencil* and the year and number of the notice should be shown against them, e.g.:—N.M. 625/1947 temp., and also in the bottom left-hand corner of the chart, in pencil, *below* the small corrections notations (*see* above). Temporary corrections should be rubbed out when the notice is received cancelling them, but preliminary corrections should be inked in when the notice is received reporting that the changes have been made.

Charts stocked by the Hydrographic Supplies Establishment, Admiralty Chart Agents and the Admiralty Chart Depôts are *not* corrected from Temporary or Preliminary Notices to Mariners, and when charts are received from one of these sources they should be corrected in pencil as necessary from the copies of such Notices already held, or from those supplied with the charts.

Corrections from Radio Navigational Warnings concerning derelicts and drifting obstructions, the temporary extinction of lights, displacement of important aids to navigation, ice reports, &c., should also be noted *in pencil*, as received, on the charts affected. Radio Navigational Warnings of a permanent nature and those relating to derelicts and drifting obstructions dangerous to navigation are re-issued in the form of Admiralty Notices to Mariners, but other warnings are not re-issued in this way, except in special circumstances.

Corrections from information received from authorities other than the Admiralty should be noted, *in pencil*, on the charts affected, but no charted danger is to be expunged without the authority of the Hydrographer of the Navy.

NAVIGATIONAL PUBLICATIONS.

1. Admiralty Sailing Directions, Supplements, &c.—The Admiralty Sailing Directions, consisting of about 73 volumes for the whole world, contain general information useful to the navigator.

An index chart bound near the beginning of each volume shows the area dealt with and the serial numbers and limits of all Admiralty charts for the area which were published *when the volume was printed*.

Each volume is periodically revised throughout, and, in the intervals between the publication of new editions, Admiralty Notices to Mariners and Supplements are published to enable the volume to be corrected. It should, however, be clearly understood that Sailing Directions cannot be correct in all minor details after the date of the latest Supplement.

The above-mentioned corrections are not made in the Sailing Directions stocked by the Hydrographic Supplies Establishment, Admiralty Chart Agents or the Admiralty Chart Depôts.

A new edition of each volume of Sailing Directions is published at intervals of approximately from ten to twelve years. The number of the latest Admiralty Notice to Mariners used in its compilation is given in the "Advertisement" on page iii of each volume, and the numbers of the Notices affecting it between the dates of going to press and issue to ships and establishments are given in the Notice announcing its publication, to enable the new edition to be corrected before being brought into use.

A Supplement to each volume is generally published annually, each succeeding Supplement cancelling the former. When a volume is taken up for revision, however, no further Supplement to that edition is issued, but subsequent Notices to Mariners affecting it are summarised each year and issued as a separate publication, until the new edition of the volume is published.

A tabular form for notation of the existence of Supplements and Summaries of Notices is printed on the front fly-leaf of all Sailing Directions, and these notations are made as necessary in all copies issued by the Hydrographic Supplies Establishment and the Admiralty Chart Depôts.

Supplements and Summaries of Admiralty Notices to Mariners should be retained intact. *Whenever reference is made to the Sailing Directions, the Supplement, and where applicable the Summary, must be consulted.* The existence of a Supplement or Summary of Admiralty Notices to Mariners is to be entered in the tabular form inside the cover of the Sailing Directions. New and amended information appearing in the Supplements for the first time is indicated by square brackets, and deletions from the previous Supplement are indicated by horizontal lines.

Admiralty Notices to Mariners affecting Sailing Directions *are not* to be cut up and pasted in, but the book is to be annotated in the margin, or corrected in manuscript, as convenient.

2. The Admiralty List of Lights, Fog Signals and Visual Time Signals.—The Admiralty List of Lights, Fog Signals and Visual Time Signals for the world is issued in twelve volumes divided geographically as shown on the index chart at the beginning of each volume.

Light-buoys are *not* included in the list.

The volumes are published annually at the rate of one volume per month commencing with Volume 1 about March and ending with Volume 12 about February. Supplements to these volumes will not be issued.

Each volume will be issued with an inscription on its cover and title page stating the date to which the volume has been corrected, which will be approximately six weeks prior to the date of its issue. Corrections or additions to each volume, which may occur between the date of correction and date of issue, will be promulgated by Section III of Admiralty Notices to Mariners.

Amendments.—Important amendments are promulgated in Admiralty Notices to Mariners. In Section III of each Weekly Complete Edition of these Notices will be found all additions and alterations made to Lights, Fog Signals and Visual Time Signals by the Notices issued during the week affected; certain other additions and alterations are also included in Section III, which, though not of sufficient importance to necessitate the issue of a Notice to Mariners, will be found of use to the seaman.

Corrections to the Light Lists should be made in pencil, or extracted from Section III and pasted in the appropriate volume.

Note.—Corrections are not made in copies of the Lists of Lights, &c., stocked by the Hydrographic Supplies Establishment, Admiralty Chart Agents or the Admiralty Chart Depôts, and copies received from these sources should accordingly be corrected from the weekly editions of the Notices to Mariners before being brought into use.

3. **The Admiralty List of Radio Signals.**—The Admiralty List of Radio Signals is issued as follows:—

Volume I.—Communications—Comprises particulars of radiotelegraph coast stations, together with general regulations; it also includes such subsidiary services as medical advice supplied by radio.

Volume II.—Navigational Aids—Comprises particulars of services from direction-finding stations and radiobeacons including air radiobeacons useful to ships; also stations giving QTG service and calibration stations; all relevant codes and regulations will be found in this volume.

Volume III.—Meteorological Services—Comprises particulars of weather services provided for the use of shipping, together with relevant codes.

Volume IV.—Meteorological Observation Stations.

Volume V.—Comprises particulars of radio time signals, uniform time system, navigational warnings and position fixing systems (Decca, Loran Consul, etc.).

New editions of each volume will normally be published annually.

All corrections subsequent to the date of publication are promulgated in Section VI of the complete weekly edition of Admiralty Notices to Mariners.

Copies of the List stocked by the Hydrographic Supplies Establishment, Admiralty Chart Agents or the Admiralty Chart Depôts are not kept corrected, and Lists received from these sources should accordingly be corrected from the weekly editions of the Admiralty Notices to Mariners before being brought into use.

4. **The Admiralty Tide Tables.**—The Admiralty Tide Tables are published in three sections as follows:—

For "EUROPEAN WATERS (including Mediterranean Sea)."
For "ATLANTIC AND INDIAN OCEANS."
For "PACIFIC OCEAN AND ADJACENT SEAS."

Each section contains two parts, Part I giving tidal predictions for Standard Ports and tidal stream predictions for certain straits and channels. Part II giving data for predicting tides at places which are not Standard Ports.

Admiralty Tide Tables, Part III, contains instructions for predicting tides and tidal streams, and for analysing observations of tides and tidal streams, with tables to assist prediction and analysis.

THE USE OF CHARTS AS NAVIGATIONAL AIDS AND GENERAL REMARKS RELATING TO PRACTICAL NAVIGATION.

(1) **Reliance on a chart.**—The value of a chart must manifestly depend upon the accuracy of the survey on which it is based, and this becomes more important the larger the scale of the chart.

To estimate this the date of the survey, which is always given in the title, is a good guide. Besides the changes that, in waters where sand or mud prevails, may have taken place since the date of the survey, the earlier surveys were mostly made under circumstances that precluded great accuracy of detail, and, until a plan founded on such a survey is tested, it should be regarded with caution. It may, indeed, be said that, except in well-frequented harbours and their approaches, no surveys yet made have been so minute in their examination of the bottom as to make it certain that all dangers have been found. The fullness or scantiness of the soundings is another method of estimating the completeness of a chart. When the soundings are sparse or unevenly distributed, it may be taken for granted that the survey was not in great detail.

It appears to be insufficiently realised that the degree of reliance which may reasonably be placed upon an Admiralty chart, even in surveys of modern date, is mainly dependent on the scale on which the survey was made. The scale for publication is now generally that of the original survey, except in the case of coast sheets which are sometimes reduced. It should not, therefore, be assumed that the original survey was made on a larger scale than that published.

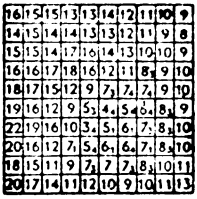
It must be borne in mind that the principal method of ascertaining the inequality of the bottom of the sea is by the laborious process of sounding, and that in sounding over any area, the boat or vessel obtaining the soundings is kept on given lines; that each time the lead descends, or a sonic sounding is taken, the depth over only a small area is obtained, in the case of the lead, it has a diameter of only a few inches, and that consequently each line of soundings, though miles in length, is only to be considered as representing a narrow width.

Surveys are not made on uniform scales, but each survey is made on a scale commensurate with its apparent importance. For instance, a general survey of a coast which vessels only pass in proceeding from one place to another is not usually made on a scale larger than one inch to the nautical mile, while surveys of areas where vessels are likely to anchor are made on a scale of three inches to the mile, and surveys of frequented ports or harbours likely to be used by fleets, on a scale of from six inches to ten inches to the nautical mile.

Close examination by sounding is the only method by which surveys on a large scale can be made, and in view of the vast mileage of surveys yet requiring completion in the interests of navigation, it would be a waste of time to undertake large-scale coast surveys.

The scale on which a survey is to be conducted having been settled, it is manifestly superfluous to obtain more lines of soundings than can be represented on the paper. 100 soundings, which is the maximum number that can be placed with clearness on every square inch of paper, means that on a scale of one inch to the mile each sounding on the chart occupies an area representing eight acres of actual ground, whilst on a scale of six inches to the mile each sounding represents an area of a little less than a quarter of an acre, i.e., of 100 feet square.

The following diagram represents as many soundings as can be placed legibly on a square inch of paper:—



16	15	15	13	13	14	12	11	10	9
14	15	14	14	13	13	12	11	9	8
15	15	14	17	16	14	13	10	10	9
16	16	17	18	16	12	11	8_3	9	10
18	17	15	12	9	7_3	7_4	7_4	9	10
19	16	12	9	5_3	4_4	5_4	6_4	8_3	9
22	19	16	10	3_4	5_1	6_1	7_3	8_3	10
20	16	12	7_1	5_4	6_1	6_4	7_1	8_3	10
18	15	11	9	7_3	7	7_1	8_3	10	11
20	17	14	11	12	10	9	10	11	13

Little assistance in detecting excrescences on the bottom is afforded by the eye, when sounding in a boat, even in clear water, on account of the observer being within five feet of the surface; none in turbid seas. If, therefore, there is no inequality in the soundings to cause suspicion, a shoal patch between two lines may escape detection.

Thus, in a chart on a scale of one inch to the mile, an inequality of some acres in extent rising close to the surface, if it happened to be situated between two lines, might escape detection; whilst in a chart on a scale of 6 inches, inequalities as large as battleships, if lying parallel with, and between the lines of soundings, might exist without detection if they rose abruptly from an otherwise even bottom.

General coast charts should not, therefore, be looked upon as infallible, and a rocky shore should on no account be approached within the ten-fathom contour line, without taking every precaution to avoid a possible danger; and even with surveys of harbours on a scale of 6 inches to the mile vessels should avoid, if possible, passing over charted inequalities in the ground, as some isolated rocks are so sharp that the lead may not find the highest part. Better results can, however, be obtained by sonic sounding owing to the rapidity with which such soundings can be taken, but even this method will not find rocks unless the boat or vessel be directly over them.

Blank spaces among soundings mean that no soundings have been obtained in these spots. When the surrounding soundings are deep it may with fairness be assumed that in the blanks the water is also deep; but when they are shallow, or it can be seen from the rest of the chart that reefs or banks are present, such blanks should be regarded with suspicion.

Soundings in hair line, which are shown on the latest charts in upright figures, and on other charts in sloping figures, indicate that such soundings have been taken from smaller scale charts, an unreliable source, or adapted from old and imperfect surveys.

(2) **Fathom lines a caution.**—Except in plans of harbours that have been surveyed in detail, the six-fathom line on most Admiralty charts is to be considered as a caution or danger line against unnecessarily approaching the shore or bank within that line, on account of the possibility of the existence of undiscovered inequalities of the bottom, which nothing but an elaborate detailed survey could reveal. In general surveys of coasts or of little frequented anchorages, the necessities of navigation do not demand the great expenditure of time required for such a detailed survey. It is not contemplated that ships will approach the shore in such localities without taking special precautions.

The ten-fathom line is, on rocky shores, as before mentioned, another warning, especially for ships of deep draught.

Charts on which no fathom lines are marked must be especially regarded with caution, as it generally means that soundings were too scanty and the bottom too uneven to enable them to be drawn with accuracy.

Isolated soundings, shoaler than surrounding depths, should always be avoided as there is no knowing how closely the spot may have been examined.

(3) **Chart on largest scale always to be used.**—It sometimes happens that from press of work, only the copper plate of the larger scale chart of a particular locality can at once receive any extensive re-arrangement of coastline or sounding. This is an additional reason, besides the obvious one of the greater detail shown, why this largest scale chart should always be used for navigating.

(4) **Caution in using small-scale charts.**—In approaching the land or dangerous banks, regard must always be had to the scale of the chart used. A small error in laying down a position means only yards on a large-scale chart, whereas on a small scale the same amount of displacement means large fractions of a mile.

For the same reason bearings to near objects should be used in preference to objects farther off, although the latter may be more prominent, as a small error in bearing or in laying it down on the chart has a greater effect in misplacing the position the longer the line to be drawn.

(5) **Graduation.**—All plans are now being graduated in skeleton style before publication in order to facilitate easy reference to geographical positions; previously published plans are also graduated as opportunity offers. The graduation is, however, of necessity often based upon imperfect information of a conflicting nature; for this reason, whenever a geographical position is quoted other than approximate (i.e., when seconds are given), it is necessary to quote also the number of the particular chart from which the position has been derived.

In this connection it is pointed out that, whenever possible, a position should be transferred from one chart to another by bearing and distance from a distinguishing feature common to both, such as a point of land or a light, &c., and not by the graduation which may differ owing to one of the charts being constructed on later and more complete geographical data than the other.

(6) **Distortion of printed charts.**—The paper on which charts are printed is, from various causes, subject to distortion, but the effect of this is seldom sufficient to affect navigation. It must not, however, be expected that accurate series of angles taken to different points will always exactly agree when carefully plotted upon the chart, especially if the lines are to objects at some distance. The larger the chart the greater the amount of this distortion.

(7) **Buoys.**—It is manifestly impossible that any reliance can be placed on buoys always maintaining their exact position. Buoys should, therefore, be regarded as warnings and not as infallible navigating marks, especially when in exposed positions; and a ship should always, when possible, be navigated by bearings of fixed objects on shore or angles between them, and not by buoys.

(8) **Light-buoys.**—The lights shown by light-buoys cannot be implicitly relied on, as, if occulting or flashing, the apparatus may get out of order, or the light may be altogether extinguished. These lights in the British isles are from 5 to 217 candle-power.

(9) **Cable-buoys.**—Cable-buoys marking the ends of submarine cables usually are spherical or can-shaped, surmounted by a globe and occasionally a flag. Below the topmark two *white fixed* lights, disposed horizontally, may be exhibited, but they cannot be implicitly relied on.

(10) **Lights.**—Arcs drawn on charts round a light are not intended to give information as to the distance at which it can be seen, but solely to indicate, in the case of lights which do not show the same characteristics or colours in all directions, the bearings between which the differences occur.

All the distances given in the Admiralty List of Lights and on the charts for the visibility of lights are calculated for a height of an observer's eye of 15 feet. The table of distances visible due to elevation, at the beginning of each volume of the Admiralty List of Lights, affords a means of ascertaining how much more or less the light is visible should the height of the eye be more or less. The glare of a powerful light is often seen far beyond the limit of visibility of the actual rays of the light, but this must not be confounded with the true range. Again, refraction may often cause a light to be seen farther than under ordinary circumstances.

When looking out for a light at night, the fact is often forgotten that from aloft the range of vision is much increased. By noting a star immediately over the light a very correct bearing may be afterwards obtained from the compass.

The intrinsic power of a light should always be considered when expecting to make it in thick weather. A weak light is easily obscured by haze, and no dependence can be placed on its being seen.

The power of a light can be estimated by remarking its candle power, as given in the Admiralty List of Lights, and in some cases by noting how much its visibility in clear weather falls short of the range due to the elevation at which it is placed. Thus, a light standing 200 feet above the sea, and only recorded as visible at 10 miles in clear weather, is manifestly of little brilliancy, as its elevation would permit it to be seen over 20 miles, if of any power. (*See* table in the Admiralty List of Lights.)

The distance from a light cannot be estimated either by its brilliancy or its dimness.

On first making a light from the bridge, by at once lowering the eye several feet and noting whether the light is made to dip it may be determined whether the vessel is in the circle of visibility corresponding with the usual height of the eye or unexpectedly nearer the light.

(11) **Fog signals.**—Sound is conveyed in a very capricious way through the atmosphere. The following points in regard to fog signals should be borne in mind:—

(*a*) Fog signals are heard at greatly varying distances.
(*b*) Under certain conditions of atmosphere, when an air fog signal is a combination of high and low tones one of the notes may be inaudible.
(*c*) There are occasionally areas around a fog signal in which it is wholly inaudible.
(*d*) A fog may exist a short distance from a station and not be observable from it, so that the signal may not be sounded.
(*e*) Some fog signals cannot be started at a moment's notice after signs of fog have been observed.

Mariners are therefore warned that fog signals cannot be implicitly relied upon, and that *the practice of sounding should never be neglected.* Particular attention should be given to placing "Look-out men" in positions in which the noises in the ship are least likely to interfere with the hearing of the sound of an air fog signal; as experience shows that, though such a signal may not be heard from the deck or bridge when the engines are moving, it may be heard when the ship is stopped, or from a quiet position. It may sometimes be heard from aloft though not on deck.

Great assistance may be obtained from radio beacons at many important lighthouses and light-vessels, but the attention of Mariners is called to the serious dangers which may arise from their misuse. No attempt should be made to approach such a position on a radio bearing, whilst relying only on hearing the sound fog signal in sufficient time to alter course to avoid danger. When the radio fog signal is transmitted from a light-vessel, it is essential in order to avoid collision, that the bearing from the light-vessel should not be kept constant.

(12) **Tides.**—In navigating coastal waters where the range of the tide is considerable, caution is always necessary. The tidal predictions for Standard ports in the Admiralty Tide Tables can generally be relied upon to give the times of high and low water to within a few minutes, and heights within a few tenths of a foot. Larger errors are to be expected in the predictions for places which are not Standard ports, computed from the data in Part II, but such predictions computed from the harmonic constants are always sufficiently accurate for the general requirements of navigation. For Standard ports the heights of the tide at times between high and low water may usually be found within narrow limits in accordance with the instructions in Parts I and III of the Tide Tables.

The datums of Admiralty charts depending on Admiralty surveys vary with the type of tide, but usually conform with the International agreement, that datum should be " a plane so low that the tide will but seldom fall below it." The datums used by different nations, however, differ very considerably and those of Admiralty charts depending on foreign surveys are always those used by the original surveyors, which vary from " lowest possible low water " to " mean low water " in tidal waters, and are usually mean sea level in non-tidal waters.

The datum used is always stated on large-scale Admiralty charts.

Caution.—Most datums are above the lowest level to which the tide may fall; the charts therefore do not always show minimum depths.

(13) **Tidal streams.**—Where the tidal streams are semi-diurnal information regarding them is usually given, in a convenient part of the chart, in tabular form or by notes, special symbols being inserted at the positions to which the information refers. In certain cases, where the information available is incomplete, the streams are indicated by means of arrows.

There are many places where the tidal streams cannot be predicted by reference to the tide at a Standard port. Although no data for predicting the times at which they flow is given, their general direction is, in many cases, indicated by arrows on the charts. For a few of the straits and channels, where these conditions exist, tidal stream predictions are given in Admiralty Tide Tables.

Tidal streams, particularly if rotary, may vary considerably both in direction and rate; predictions of the stream must therefore always be considered approximate.

The turn of the tidal stream is not usually coincident with the times of high and low water; in fact, though in estuaries, harbour entrances, &c., the stream usually turns at about the times of high and low water, in open channels, and along open coasts generally, the turn usually occurs more nearly at half-tide. Predictions of the times of high and low water must therefore never be used as predictions of the times of slack water.

It should be remembered that, even where the general direction of the stream is parallel with the shore, an indraught is usually experienced when crossing the entrances to bays and inlets.

(14) **Fixing positions.**—For further information on this subject, *see* Admiralty Manual of Navigation.

When in sight of land, every opportunity should be taken of fixing the ship's position by terrestrial objects.

(*a*) *Simultaneous bearings or angles.*—The most usual method is by compass bearings of suitable objects, and it must be borne in mind that a fix by only two bearings is liable to error, either an absolute error in taking the bearings, or those made in applying the deviation or in laying the bearings off on the chart. For these reasons, a third or check bearing of some other object should, when possible, be taken, especially when near the shore or dangers. The coincidence of the resulting three lines will prevent any mistakes if the objects are suitably placed.

The position may also be fixed by observing horizontal sextant angles of well-defined suitably placed objects. These angles may be plotted on the chart with a station-pointer. Two conditions are, however, necessary to its successful employment; first, that the objects be well chosen; and, second, that the observer is skilful and rapid in his use of the sextant and station-pointer. For the former, reference can be made to the pamphlet on the use of the station-pointer, or to the Admiralty Manual of Navigation; the latter is only to be obtained by practice.

It will readily be seen that a sextant often offers advantages, as angles can be obtained from any position whence the objects are visible, and the fix is in no way dependent on the compass.

In many narrow waters also, where the objects may yet be at some distance, as in coral harbours or narrow passages among mud banks, navigation by sextant and station-pointer is invaluable, as a true position can only be obtained by its means. A small error in either taking or plotting a bearing under such circumstances may put the ship ashore.

In all cases where great accuracy of position is required, such as the fixing of a rock or shoal, or the addition to a chart of fresh soundings or new buildings, angles should invariably be used. In such cases angles should be taken of a number of objects, five being a good number, since this not only fixes the position beyond doubt, but also affords a useful check on the accuracy of the chart itself. When running a line of soundings it is only necessary to take a third angle every now and then, firstly to make certain that the more important soundings, as at the end of a line, are correctly placed, and secondly to check the general accuracy of the chart.

Sometimes when only one of the selected objects is visible from the compass, a compass bearing of it and a sextant angle to the other may be used to fix the position.

(*b*) *Simultaneous bearing and distance.*—Attention is also directed to the very useful and handy method of fixing by the bearing and distance of a suitable object.

Should the ship be supplied with ranging equipment, its use here is obvious, but without it a very good approximate distance of an object of known height may be obtained by observing its angle of elevation and obtaining its distance from Lecky's Offshore Distance Tables, which are supplied with all sets of charts. Full directions for the use of these Tables are given with them.

(*c*) *The running fix.*—If two position lines are obtained at different times the position of the ship may be found by transferring the first position line up to the time of taking the bearing for the second position line. The point of intersection of the second and the transferred position line is the ship's position at the time of the second observation.

The accuracy of this fix will depend on the accuracy of the estimated run (over the ground) between bearings and, therefore, it is essential to take great care that an accurate allowance is made for tidal stream, current, and leeway experienced by the ship during this interval.

The method of fixing by doubling the angle on the bow is useful when passing points of land, &c., in waters where there is either no tidal stream or current, or where this can be estimated with sufficient accuracy.

This method is as follows:—

Suppose that the angle between the ship's head and an object is measured, and found to be X°, and that the time of the observation is noted. Suppose also that the time is again taken when the angle between the ship's head and the object is 2X°. Then, if the course made good is the course steered, the distance of the ship from the object at the time the second bearing was taken is equal to the run (over the ground) in the interval. Hence the ship's position can at once be laid off as a bearing and distance from the object. In practice the angle X should not be less than about 25°.

The most usual form of this method, the so-called "four-point" bearing, gives a good fix for a departure, but does not ensure safety, as the point and any dangers that may lie off are abeam before the position is obtained.

The above fix is reliable when there is no tidal stream or current or when it runs directly with or against the course of the ship. When the stream or current runs across the course of the ship or when leeway is to be allowed for, this method should never be used and the ship's position should be obtained by plotting the two bearings as a running fix.

A table " Distance of an object by two bearings " is supplied with certain chart folios, and is also given in Inman's Tables, by which the ship's position at the second bearing can be found: any two bearings at a suitable angle to each other may be used, together with the run between them, but, again, this table should not be used when the vessel is subject to a cross tidal stream or leeway.

(*d*) *The danger angle.*—The use of the danger angle in passing outlying dangers with land behind them should also not be forgotten.

A vertical danger angle is useful when the danger lies off an object such as a lighthouse, the height of which is known; the angle being obtained from the aforesaid Lecky's Tables. If a horizontal danger angle between two objects is used, however, caution is necessary, as, should the objects not be correctly placed on the chart, the angle taken from it may not serve the purpose. This method should not, therefore, be employed when the survey is old or manifestly imperfect.

(*e*) *The astronomical position line.*—When fixing by astronomical observations, attention is drawn to the great utility of the position line. Even a single position line may at times give invaluable information, as the ship must be somewhere on this line, provided that the chronometer error is accurately known.

A sounding obtained at the same time may often serve to give an approximate position. Again, by steering along, or at a required distance parallel to, a single position line, a vessel may make her port or avoid a danger, although uncertain of her position.

A very accurate position may be obtained by observations of three or more stars at evening or morning twilight, or by the observation of a bright star at daybreak and another shortly afterwards of the sun when a few degrees (not less than 10°) above the horizon. The position lines obtained from the bodies observed should differ in azimuth by 30° or more.

Mariners are also reminded that, with modern tables for correcting the altitude, observations of the moon entail practically no more calculation than those of a planet. Moon sights are sometimes available when stars are obscured by light cloud, &c.; also, an excellent position may frequently be obtained by simultaneous observations of the sun and moon.

(*f*) *The radio position line.*—A number of radio systems of which the principal ones are M/F D/F, Radio Beacons, Consol Beacons, Loran, Gee and Decca, are now in general use from which position lines or fixes may be obtained.

The accuracy and range which may be obtained from these systems vary considerably; their great advantage over other methods lies in the fact that they can be employed under all weather and visibility conditions, though in some cases the results obtained will vary between day and night.

Special receiving equipment is generally required in order to make use of the radio signal, and some systems require special lattice charts or tables for plotting the position lines. Full details of these systems and their coverage areas are contained in Admiralty List of Radio Signals, Volume II.

The mariner should appreciate that with the position-fixing systems the accuracy of a fix will depend on three factors:—

(i) The distance of the observer from the transmitters.
(ii) The bearing of the observer from the base line joining the pair of stations which he is using.
(iii) The angle of intersection of the hyperbolic position lines.

It should be apparent from the inspection of any lattice chart that an inherent small equipment error, or a small personal error that may occur at the receiver, will cause a geographical error of varying amount according to the observer's position.

It is important to realise that accurate equipment is no guard against the vagaries of the propagation of radio waves. The beacons and systems operating on medium and low frequencies are liable to " night error " in areas where the ground and sky waves are received with equal strength; these areas will occur at ranges depending upon the particular frequency used by any beacon or system. Where the transmissions of two stations are synchronised to provide one signal reading and position line, " night error " will be a minimum along the normal to the base line joining the pair of stations, and a maximum towards the limits of their service sector.

Little is yet known about the effects of hills and discontinuities in the terrain (such as cliffs) on the speed of medium- and low-frequency radio waves.

At the other end of the radio spectrum the transmissions of systems operating on the very high frequencies are subject to distortion in abnormal atmospheric conditions.

(*g*) *Fixing by radar.*—Radar may also be of considerable assistance when navigating in coastal waters in low visibility or at night. It is essential, however, to appreciate the limitations of a radar set when interpreting the information obtained from it. It must be remembered that the radar horizon is only slightly farther than the visual horizon would be, in good visibility, for a height of eye equal to the height of the radar aerial. Hence no echoes will be received from a coastline lying below the radar horizon, while echoes may be received from high ground farther inland which will give a misleading impression of the range of the nearest land.

Depending on the width of its beam, the bearings from a radar set tend to be inaccurate. It is therefore preferable when fixing by radar to use ranges rather than bearings. It is then most important to consider carefully the identity of the object giving the echo, using the bearing as an indication, and the height of the object to determine whether it will appear on the radar presentation. Radar Range Nomograms are useful in deciding this, but a satisfactory result can be obtained by using " Distance to Sea Horizon Tables."

When two or more objects on the radar presentation have been selected and positively identified, a satisfactory fix can be obtained by striking arcs on the chart with the radar range of the selected objects. These arcs intercept at the ship's position. Best results will be obtained by using isolated objects such as detached lighthouses, rocky islets, and the extremities of long piers or jetties, but where no such objects are available a steep coastline with cliffs should be used. Flat or gently shelving coastlines, such as mud flats or sand dunes, should not be used since it is difficult to identify any portion of them on the radar presentation. Identification is assisted in some areas by fitting objects, such as buoys and beacons, with radar reflectors, causing them to return strong echoes. Attention is drawn to the symbols with which such objects are marked on Admiralty Charts, and which are given in the latest edition of Chart No. 5011, " Explanation of signs and abbreviations used on Admiralty Charts."

The difficulty of positive identification of objects is largely reduced if a Chart Comparison Unit is used in conjunction with the navigational radar. Fixes obtained with this equipment employ, in principle, an infinite number of ranges of the terrain in the vicinity of the ship, and in so doing a satisfactory fix will normally be assured.

In addition, radar beacons are available in some areas. Details of these and their use are given in the Admiralty List of Radio Signals, Volume II.

(15) **Observations for errors of the compass.**—No opportunity should be neglected for checking the error of the compass. When coasting, and a well-surveyed and fairly large-scale chart is available, an excellent method of observing the error is by taking the compass bearing of two suitable objects when in transit, and comparing this with the charted bearing; there should be sufficient distance between the objects to provide a sensitive transit. When this method is not available the error should be obtained by azimuths of a heavenly body. Errors should be observed on any change of course on which the ship is steadied for a reasonable time, and at least twice a day when steering a steady course for long periods.

(16) **Change of variation of the compass.**—The gradual change in the variation must not be forgotten in laying down positions by bearing on charts. The magnetic compasses placed on the charts for the purpose of facilitating plotting become in time slightly in error, and in some cases, such as with small scales, or when the lines are long, the displacement of position from neglect of this change may be of importance. The compasses are re-engraved when the error amounts to a degree, but the chart plates cannot be corrected more frequently from the impossibility of making alterations often on one spot in a copper plate.

The geographical change in the variation is in some parts of the world sufficiently rapid to need consideration. For instance, in approaching Halifax from Newfoundland the variation changes 10°

in less than 500 miles, and in the English channel about 5° in 400 miles. The Variation chart should be consulted on this head.

On certain general charts embracing large areas with considerable change of variation, true compasses are placed instead of magnetic compasses, the variation being shown by *isogonic lines* (curves of equal magnetic variation), in a similar manner to the Variation chart. One or two *isogonic lines* are also sometimes placed on charts, in addition to the magnetic compasses, in order to indicate the general direction of these curves, and thus facilitate the determination of the variation to be employed in portions of the chart not in immediate proximity to any one of the engraved compasses. Magnetic variation values shown on Admiralty charts are for the 1st July of the year mentioned.

(17) Local magnetic disturbance of the compass on board ship.—The term "local magnetic disturbance" has reference only to the effects on the compass of magnetic masses external to the ship in which it is placed. Observation shows that such disturbance of the compass in a ship afloat is experienced only in a few places on the globe. Magnetic laws do not permit of the supposition that it is the visible land which causes such disturbance, because the effect of a magnetic force diminishes in such a rapid proportion as the distance from it increases that it would require a local centre of magnetic force of an amount absolutely unknown to affect a compass half a mile distant.

Such deflections of the compass are due to magnetic ores in the bed of the sea under the ship, and when the water is shallow, and the force strong, the compass may be temporarily deflected when passing over such a spot, but the area of disturbance will be small, unless there are many centres near together. Such areas are depicted by a special symbol on charts, and the cause of the magnetic disturbance is referred to as a Local Magnetic Anomaly.

They may also be due to wrecks lying on the bottom in moderate depths, but investigations have proved that, while deflections of unpredictable amount may be expected when very close to such wrecks, it is unlikely that deflections in excess of 7° will be experienced, nor should the disturbance be felt beyond a distance of 250 yards.

It is very desirable that whenever a ship passes over an area of local magnetic disturbance, the position should be fixed, and the facts reported as far as they can be ascertained.

(18) Use of oil for modifying the effect of breaking waves.—Many experiences of late years have shown that the utility of oil for this purpose is undoubted, and the application simple.

The following may serve for the guidance of seamen, whose attention is called to the fact that a very small quantity of oil, skilfully applied, may prevent much damage both to ships (especially the smaller classes) and to boats, by modifying the action of breaking seas.

The principal facts as to the use of oil are as follows :—

1. On free waves, i.e., waves in deep water, the effect is greatest.

2. In a surf, or waves breaking on a bar, where a mass of liquid is in actual motion in shallow water, the effect of the oil is uncertain, as nothing can prevent the larger waves from breaking under such circumstances ; but even here it is of some service.

3. The heaviest and thickest oils are most effectual. Refined kerosene is of little use ; crude petroleum is serviceable when nothing else is obtainable ; but all animal and vegetable oils, such as waste oil from the engines, have great effect.

4. A small quantity of oil suffices, if applied in such a manner as to spread to windward.

5. It is useful in a ship or boat, both when running, or lying to, or in wearing.

6. No experiences are related of its use when hoisting a boat up in a sea-way at sea, but it is highly probable that much time and injury to the boat would be saved by its application on such occasions.

At anchor, when the sea is sufficient to render it difficult to hoist up or in boats, oil bags from forward or from the swinging booms have been found to render the sea alongside comparatively smooth.

7. In cold water, the oil, being thickened by the lower temperature, and not being able to spread freely, will have its effect much reduced. This will vary with the description of oil used.

8. The best method of application in a ship at sea appears to be: hanging over the side, in such a manner as to be in the water, small canvas bags, capable of holding from one to two gallons of oil, such bags being pricked with a sail needle to facilitate leakage of the oil.

The position of these bags should vary with the circumstances. Running before the wind they should be hung on either bow and allowed to tow in the water.

With the wind on the quarter the effect seems to be less than in any other position, as the oil goes astern while the waves come up on the quarter.

Lying to, the weather bow and another position farther aft seem the best places from which to hang the bags, with a sufficient length of line to permit them to draw to windward, while the ship drifts.

9. Crossing a bar with a flood tide, oil poured overboard and allowed to float in ahead of the boat, which would follow with a bag towing astern, would appear to be the best plan. As before remarked, under these circumstances the effect cannot be so much trusted.

On a bar with the ebb tide it would seem to be useless to try oil for the purpose of entering.

10. For boarding a wreck, it is recommended to pour oil overboard to windward of her before going alongside. The effect in this case must greatly depend upon the set of the current, and the depth of the water.

11. For a boat riding in bad weather from a sea anchor, it is recommended to fasten the bag to an endless line rove through a block on the sea anchor, by which means the oil is diffused well ahead of the boat, and the bag can be readily hauled on board for refilling if necessary.

12. Towing a vessel in a heavy sea, oil is of the greatest service, and may prevent parting the hawser. Distribute from the towing vessel forward and on both sides; if used only aft the tow alone gets the benefit.

(19) **Mirage and abnormal refraction.**—An unusual lapse rate of temperature (and therefore density as well) with height immediately above the sea (or land) surface produces a distortion in the appearance of objects near the horizon; such a phenomenon is known as mirage.

When the surface is relatively cold (and the wind very light) so that the density of the air decreases rapidly for a short distance above the surface, light rays from objects low down near the horizon are bent down, the same way in fact as are usually the rays of the sun when entering the earth's atmosphere at a low altitude. The effect is to render visible objects that are normally below the horizon, e.g., lights may be "raised" at night at much greater distances than one would ordinarily expect. This phenomenon is known as "looming."

A further occasional effect produced when the air is appreciably warmer than the sea, is "superior mirage" in which an inverted image is seen over the real object; sometimes an erect image is seen immediately above and touching the inverted one. The object and its images in this instance are well defined in contrast to the shimmering object and image of the inferior mirage. Superior mirage is most often experienced in high latitudes and wherever the sea surface temperature is abnormally low.

"Inferior mirage," the effect of which is to decrease the distance at which objects are visible in a horizontal direction, is due to a rapid increase of density with height close to the surface such as occurs when air of comparatively low temperature blows over a warmer sea, or over a tarred road or desert when a hot sun is beating down on it. In either event light rays are bent up when approaching the surface where the density of the air is much less than above. The coastline, and at times a ship or island, may appear to be floating in air above a shimmering horizon, possibly with, in the former instance, her hull either invisible or with an inverted image underneath. Inferior mirage is comparatively uncommon at sea and is more likely to be observed along a coastline than well out to sea.

When mirage is evident caution must be used in taking sights with a sextant, for abnormal refraction must necessarily be present also. With inferior mirage better, but not normal, results will usually be obtained by ascending as high as possible in the ship; with superior mirage the height of eye should be as low as possible. It is, however, advisable, whenever abnormal refraction is suspected, to measure the elevation of the celestial body above the back as well as the front horizon as explained in navigational text-books.

(20) **Aurora.**—The most common form of aurora is an arc system, single or multiple, narrow and well defined, or broad and diffuse, and centred on the magnetic meridian.

The most usual colour is pale whitish green when the auroral activity is weak and diffuse: but when the aurora arises high towards the zenith in the form of rays, rayed curtains and draperies with much rapid movement of the constituent rays, the colours sometimes become much stronger and more vivid, and include bright green, red and violet. When the curtains forming the aurora converge to form a corona, which may rotate very rapidly about the point of convergence, the displays may become very complex, filling practically the whole sky, and extending far to the equatorial side of the zenith with much rapid movement and change of colour from instant to instant.

Though the most usual duration of auroral displays in these high latitudes is several hours, they not infrequently last throughout the whole night from dusk to dawn. In such long displays the really intense and violently active periods with vivid strong colours are generally confined to spasms of 15–30 minutes, with the intervening periods filled with diffuse glows or quiet arc systems.

The absolute intensity of the light of the aurora is seldom great, and the brighter stars usually glimmer through it. In the most vivid and intense displays, the light may equal, but rarely surpasses, that of the full moon in a cloudless sky. It may give enough light to read by. On such occasions the aurora may be visible to some extent in partial twilight.

Though in high latitudes aurora occurs any time in the dark hours it is probably most frequent in the late evening hours from 9 p.m. till midnight or just after; it is more frequent in the equinoctial months than at other times and has a well-defined 11-year period of activity following the cycle of solar activity. A maximum of activity occurred in 1948, and the interval from maximum to minimum activity usually occupies a period of about 6 to 7 years. In high latitudes this cycle of activity is reflected more in the intensity and vividness of the displays than in their frequency of occurrence. Though really outstanding displays tend to occur around the years of maximum activity they may occur at any time of the cycle, except perhaps near the absolute minimum.

In addition to this 11-year cycle of activity active periods tend to recur at intervals of 27 days, *see* Magnetic Storms.

Northern hemisphere.—Aurora Borealis occurs most frequently along a zone which forms an approximate oval, of average radius 23°, with centre in the extreme north-west of Greenland. This zone of maximum frequency crosses Hudson Bay and the Labrador coast in about lat. 58° N. It runs south of Cape Farewell and along the south coast of Iceland. It lies just north of North Cape, touches the extreme north of Novaya Zemlya, skirts Cape Chelyuskin and then eastward just north of Wrangel Island into the north of Alaska. Along this zone aurora of some kind can probably be seen every suitable night when the sky is clear; 250 miles outside this maximum zone to the southward the auroral frequency decreases sharply to about 70–100 nights a year on the average, and to 20–25 nights 500 miles south of the maximum zone. Inside the maximum zone the geographical distribution of frequency is not so well established but it probably falls off more gradually than it does outside.

On the zone of maximum frequency itself aurora appears as frequently to the south of the zenith as to the north, but with increasing distance outside the zone the appearances concentrate more into the northern sky; the reverse is true inside the zone.

Southern hemisphere.—The frequency and distribution of Aurora Australis is not fully known. It is probable that it is more frequently seen at sea between about long. 50° E. and 175° W. than in other longitudes. Very fine displays have occasionally been seen in Australasia and on passages across the Southern Ocean. There is nevertheless a general impression that aurora is less frequent in the southern than in the northern hemisphere. This is probably to be accounted for by the fact that, apart from whaling and exploring expeditions, ships' tracks in general do not extend to such high latitudes as in the northern hemisphere.

The zone of maximum auroral frequency is roughly annular and is near the circumference of a circle of radius about 1,080 miles, centred in about lat. 75° S., long. 129° E. The frequency falls off both outside and inside this zone. A large part of the zone is within the continent of Antarctica.

(21) **Magnetic storms.**—Magnetic storms vary in intensity and frequency with the sunspot cycle, similarly to aurorae. An intense magnetic storm is always accompanied by a bright and active aurora. The deeply coloured aurorae, showing more pronounced red and green, and sometimes also blue and violet, tints, are invariably connected with magnetic storms of considerable or great intensity. Such a storm will produce simultaneous aurora in both hemispheres. In the greatest storms aurorae in some form may be visible down to about 20° north latitude in certain parts of the oceans, especially

between the meridians of 30° W. and 140° W. Magnetic storms vary greatly in duration from a few minutes to several days; they are generally more intense during the hours of darkness. Long-continued storms usually show great fluctuations with periods of complete or partial quiescence. Similarly the associated aurora fluctuates between active and quiescent forms.

The origin of magnetic storms and aurorae is not yet fully understood, but they are intimately connected with the state of a local area of the sun. As the same part of the sun is again presented to the earth after an interval of about 27 days, a magnetic storm and aurora may recur at this time, usually in less intense form.

A ship's compass may tend to deviate during the progress of a considerable magnetic storm. In more intense storms the compass needle may oscillate 1° or more either side of its normal position. Such oscillation may persist for as long as 10 or 20 minutes before dying out. Further oscillation may occur after a period of quiescence. Deviations of 2° or more are rare, but during the great magnetic storm and aurora of January 25th, 1938, one of 4° to the eastward was observed off the Portuguese coast. During a severe magnetic storm the compass may be deflected continually in one direction to the extent of about half a degree for some hours. When bright aurora is seen, especially if it is of the more deeply coloured and rapidly moving kind, and particularly when it is observed in low latitudes, the possibility of deflections of the compass should always be borne in mind.

During a considerable magnetic storm freak wireless reception may occur on certain waves and short-wave transmission may fade to complete silence. Beam radio communication, especially in a west-east or east-west direction, may be interrupted. Such conditions may last in some degree over a period of several days, at times when the sun is unusually active. Short-wave fading also occurs occasionally from a different form of solar disturbance known as a "bright eruption," when this is very intense. On the average such fading begins about 7 minutes after occurrence of the bright eruption and may last 5 or 10 minutes, gradually returning to normal within a period of 40 to 45 minutes. These fadings are confined to the daylight hemisphere of the earth, while the magnetic storm fadings may occur by day or by night.

GENERAL METEOROLOGY.

(All the following articles do not apply to every Pilot, but articles applicable to this Pilot will be referred to in the Climate and Weather Section in Chapter I.)

(1) **Lows.**—A low, or depression, appears on a synoptic chart as a series of isobars roughly circular or oval in shape, surrounding an area of low pressure. It is a main feature of the weather at sea in middle latitudes where it is responsible for most of the occasions of strong winds and unsettled weather, though not all depressions are accompanied by strong winds.

Lows vary very much in size and depth; one may be only a hundred miles in diameter and another over two thousand miles; some are deeper than others, a deep low being one in which the pressure is very much lower near the centre than on the outside whereas, on the other hand, a shallow depression is one where the pressure, although low near the centre, is not very much lower than in the surrounding districts.

Note.—The bracketed equivalents hereunder refer to the Southern Hemisphere.

In the northern (southern) hemisphere the winds blow round an area of low pressure in an anti-clockwise (clockwise) direction ; there is also a slight inclination across the isobars towards the lower pressure. Thus the well-known rule for the northern (southern) hemisphere is that when an observer faces the wind the direction of the lowest pressure is from 8 to 12 points to his right (left). The strength of the wind is in all instances closely related to the steepness of the barometric gradient or distance apart of the isobars ; the closer the isobars the stronger the wind.

Lows may move in almost any direction, though most often towards north-east (south-east) or east, at a speed of anything between 10 and 40 knots, though occasionally as much as 60, during the middle and most active stage of their existence ; they slow down when filling up (*see* " occlusion " below). The life of a low is in the region of 4 to 6 days.

There are usually one or more fronts, probably radiating from the centre, in the area covered by a low ; each front on a synoptic chart represents a belt of relatively bad weather, accompanied by a veer (backing) of wind, which marks the change from the weather characteristic of one air mass to that of another. During the first two or three days of its life a low has a warm and a cold front, the area between the two being known as a warm sector because the air has come from a warmer locality than that which is outside the sector (*see* Fig. 1*a*). Warm air is lighter than cold air and it rises over the cold air ahead of the warm front as shown in Fig. 1*b* ; this causes condensation of the water vapour in the warm air, forming at first cloud and later drizzle or continuous steady rain. The cloud spreads out ahead of the warm front, and the highest cloud, cirrus or mares' tails, is often about 500 miles ahead. At the rear boundary of the warm sector, known as the " cold front," the cold air is pushing under the warm air forcing the latter to ascend rapidly ; this process is sometimes violent enough to produce squalls. The rapid ascent of the warm air causes the moisture to condense in the form of cumulo-nimbus clouds (shower clouds), from which heavy showers may fall. The cold front gradually overtakes the warm front so that the warm sector is eventually lifted up from the earth's surface. When this has occurred the low is said to be occluded, and the warm and cold fronts have merged into the third type of front known as an " occlusion " (*see* Figs. 2*a* and *b*). When a low has become occluded, it usually decreases in intensity and rate of travel, and gradually fills up. On the other hand, a low which has a marked warm sector is likely to be deepening, the winds associated with it may increase in force and its rate of travel may increase. Lows are usually travelling in a direction approximately parallel to the isobars (and in the direction of the wind) in the warm sector.

The approach of a low is indicated by a falling barometer. In the northern (southern) hemisphere, if the low is approaching from westward and passing northward (southward) of the ship, clouds appear on the western horizon, the wind shifts to a south-westerly (north-westerly) or southerly (northerly) direction and freshens, the cloud layer gradually lowers, and finally drizzle, rain or snow begins. If the low is not occluded, after a period of continuous rain or snow there is a veer (backing) of wind at the warm front, a rise of temperature and diminution or cessation of rain (or snow) in the warm sector, the visibility being usually moderate and the sky overcast with low cloud.

The passage of the cold front is marked by the approach from westward of a thick bank of cloud (which however cannot often be seen because of the customary low overcast sky in the warm sector), a further veer (backing) of wind to west or north-west (south-west), sometimes with a sudden squall, rising pressure, a fall of temperature, squally showers of rain, hail or snow, and improved visibility (except during showers). The squally showery weather with a further veer (backing) of wind and drop in temperature may recur while the low recedes owing to the passage of another cold front or occlusion. If the low is occluded, the occlusion is preceded by the cloud of the warm front; there may be a period of continuous rain mainly in front of and at the line of occlusion, or a shorter period of heavy rain mainly behind the occlusion, according as the air in front of the occlusion is colder or warmer than that behind it. There may be a sudden veer (backing) of wind at the occlusion.

Often another low follows 12 to 24 hours later, in which event the barometer begins to fall again and the wind backs towards south-west (north-west), or even south (north).

If a low travelling eastward or north-eastward (south-eastward) is passing southward (northward) of the ship, the winds in front of it are easterly and they back (veer) through north-east (south-east) to north (south) or north-west (south-west); changes of direction are not likely to be so sudden as on the southern (northern) side of the low. In the rain area there is often a long period of continuous rain and unpleasant thick weather with low cloud. In winter in the colder regions the weather is cold and raw and precipitation is often in the form of snow.

Near the region of lowest pressure, lulls are sometimes experienced, but sudden changes are likely, and in a deep low the wind may increase in strength very rapidly, perhaps to gale force as the barometer begins to rise.

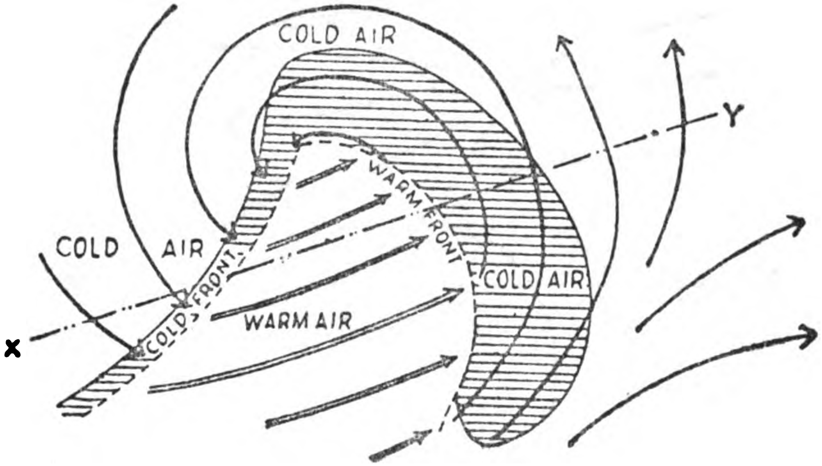
Sometimes in the air circulation of a large low, usually on the equatorial side and often on a cold front, a secondary depression develops, travelling in the same direction as the primary but usually more rapidly. The secondary often deepens while the original low decreases in intensity. In the region between the primary and the secondary depressions, the winds are not as a rule strong; but on the further side of the secondary, usually the southern (northern) side, winds are likely to be strong and they may reach gale force. Thus the development of a secondary may cause gales at a greater distance from the primary than anticipated, while there may be only light winds where gales were expected.

The above is a brief general description of lows and the associated weather in temperate or middle latitudes of the northern (southern) hemisphere. It must be emphasised, however, that individual lows in different localities differ considerably from one another, according to the characteristics (especially the temperature and humidity) of the air currents of which they are composed, and the nature of the surface over which they are travelling.

(2) **Tropical revolving storms.**—*Practical rules for avoiding them.*—These storms are so named because the wind blows round an area in which the lowest pressure is at the centre. The direction of rotation is anti-clockwise in the northern hemisphere and clockwise in the southern hemisphere. The wind does not revolve round the centre of low pressure in concentric circles but has a spiral movement inwards, towards the centre of the storm field.

NORTHERN HEMISPHERE.

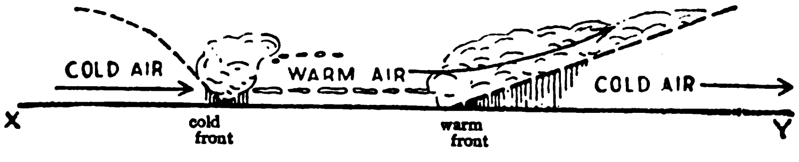
Fig. 1a.



Plan of a developed depression.

The double lines show the flow of the warm air, and the single lines the flow of the cold air.
The shading shows the areas where rain (or snow) is most probable.
Width of rain belt ahead of warm front is generally between 100 and 200 miles.

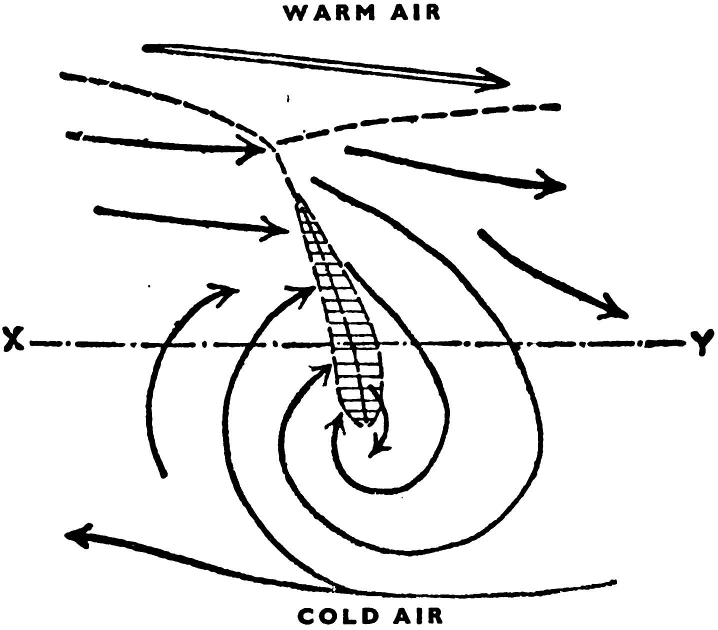
Fig. 1b.



Vertical section of the depression along the line XY.

[*See over page.*

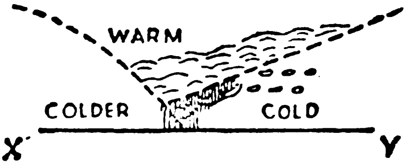
Fig. 2a.



Plan of an occluded depression.

The shading shows where rain (or snow) may be expected near the occlusion.

Fig. 2b.

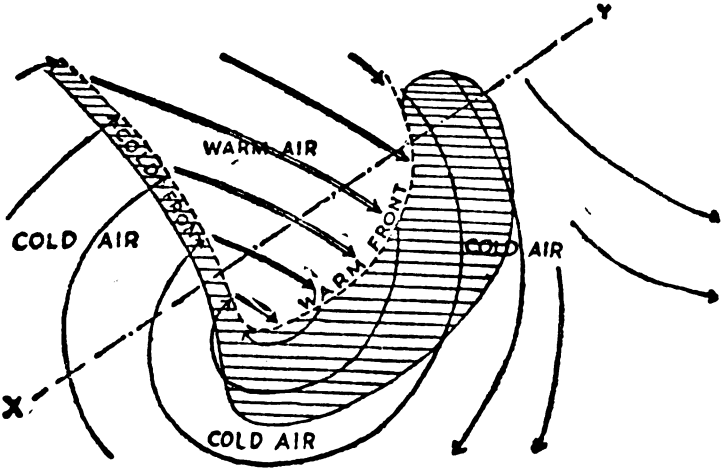


Vertical section of an occlusion of the cold front type.

The air in front of the occlusion is warmer than the air behind it.

SOUTHERN HEMISPHERE.

Fig. 1a.



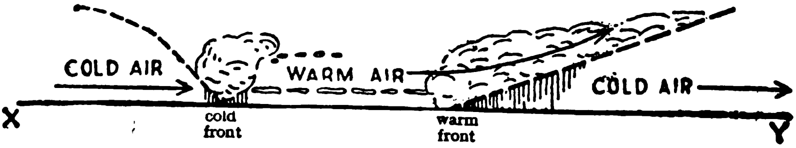
Plan of a developed depression.

The double lines show the flow of the warm air, and the single lines the flow of the cold air.

The shading shows the area where rain (or snow) is most probable.

Width of rain belt ahead of warm front is generally between 100 and 200 miles

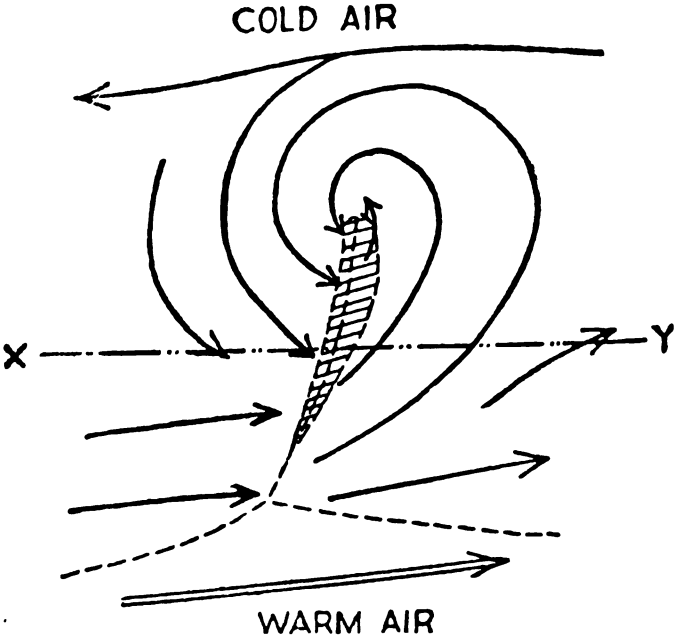
Fig. 1b.



Vertical section of the depression along the line XY.

[*See over page.*

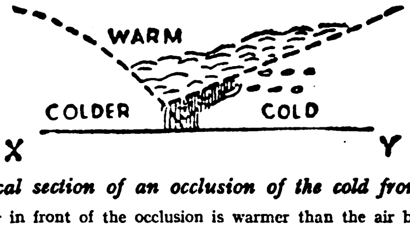
Fig. 2a.



Plan of an occluded depression.

The shading shows the region where rain (or snow) may be expected near the occlusion.

Fig. 2b.



Vertical section of an occlusion of the cold front type.

The air in front of the occlusion is warmer than the air behind it.

A tropical storm is not so extensive as the depression of higher latitudes but, within 75 miles or so of the centre, the wind is often far more violent, and the high and confused seas near the centre may cause considerable damage to large and well-found ships, while small vessels (for example, destroyers) have foundered. The danger is still greater when ships are caught in restricted waters without adequate room to manœuvre. Within 5 to 10 miles of the centre the wind is light or moderate and variable, the sky is clear or partially so, and there is a heavy, sometimes mountainous, confused swell; this area is known as the " eye " of the storm. After passing through the relatively windless centre of the storm the wind will suddenly, and with great violence, commence to blow from a direction almost opposite to that experienced on the other side of the windless centre. Due to torrential rain and sheets of almost continuous spray, visibility near the storm centre (but outside the " eye ") is almost nil.

Every ship navigating in an area subject to tropical storms during the season of their occurrence should be constantly on the alert for any sign of their approach, so that steps can be taken to avoid the danger zone while there is still time and sea-room.

Localities, season, and average frequency.—Tropical storms occur for the most part on the western side of the oceans, though they are also experienced in the Bay of Bengal, off the north-west coast of Australia, and off the west coast of Central America. They are unknown in the South Atlantic. They are given various names according to the part of the World in which they occur.

Western North Atlantic Eastern North Pacific South Pacific	–hurricanes
Western North Pacific	–typhoons
Indian Ocean Bay of Bengal Arabian Sea	–cyclones
North-west Australia	–willy-willies

They are most frequent during the late summer and early autumn of their hemisphere; they are comparatively rare in the southern hemisphere from mid-May to November, and in the northern hemisphere from mid-November to mid-June. In the Arabian Sea, however, storms are most likely to occur at the change of the monsoon, i.e., October–November, and May–June, though they average only one or two a year. Out-of-season storms occur from time to time, particularly in the western North Pacific where no month is entirely safe, and in the Indian Ocean where one is reported south of the Equator perhaps once in two years outside the usual season. The following table shows approximately the average number of severe tropical storms recorded per annum, from statistics taken over several years for the various areas :—

West Indies	5
Western North Pacific	25
,, South Pacific	3
Southern Indian Ocean	6
Bay of Bengal	2
Arabian Sea	1
Eastern North Pacific	3
West Coast of Australia	1

Variations in any one year amounting to 50% above or below the average are not unusual. Some of the figures quoted are probably an underestimate since in the less-frequented parts of the world many storms must escape detection.

Origin, movement and extent.—Tropical storms originate as a general rule in the doldrums, between the parallels of 7° and 15° of latitude; those which affect the western part of the Pacific, South Indian and North Atlantic Oceans are first reported in the western third of those oceans, though there are exceptions such as in the North Atlantic during August and September where an occasional storm is known to begin near the Cape Verde islands. In the northern hemisphere they move off in a direction between 275° and 350°, though most often within 30° of due west. When in a latitude of 25° or so they usually recurve away from the equator and, by the time they have reached the 30th parallel, the track (or path as it is more usually called) is north-easterly. In the southern hemisphere they move off in a WSW. to SSW. direction (usually the former), recurve at about 15° to 20° S., and thereafter adopt a south-easterly path. In either hemisphere many storms do not recurve but continue in a west-north-westerly (or west-south-westerly) direction until they reach the mainland where they quickly die.

The speed of advance of these storms is usually about 10 knots in their early stages, increasing a little with latitude; it seldom exceeds 15 knots before recurving, but after recurving 20 to 25 knots is usual though speeds of 40 knots or even more have been known.

Occasionally storms move erratically, the path turning towards the equator, or adopting an easterly component in a low latitude, or even making a complete loop, but on these occasions their speed of advance is low, usually less than 10 knots, while the unusual path is being followed.

The extent of the storm area varies considerably with individual storms but, generally speaking, winds of force 7 or more are improbable at more than 200 miles (especially on the equatorial side of the storm area) and force 8 is unlikely to be exceeded at more than 100 miles, from the storm centre, if in a latitude of less than 20°. Thereafter the radius increases with latitude so that these distances are nearly doubled on reaching the 35th parallel, but the intensity diminishes near the centre. Hurricane force winds are likely within 75 miles of the storm centre in the tropics, and gusts exceeding 150 knots have been reported in a few instances within 50 miles or so (except in the eye of the storm). The aim of the mariner should therefore be to remain as far as possible from the centre of the storm system.

Warning of existence or approach.—In most instances, warning of the position, intensity and probable movement of a storm is given by radio at frequent intervals by meteorological authorities ashore. (*See* Admiralty List of Radio Signals, Volume III.) Sometimes, however, there is insufficient evidence available for an accurate warning or even a general warning to be given and ships must then be guided by their own observations. Of the following indications of the proximity of a tropical storm, the first is by far the most reliable within 20° or so of the equator; it should be borne in mind, however, that very little warning may be expected of the approach of an intense storm of unusually small diameter.

(*a*) If the corrected barometer reading is 3 mb. or more below the mean for the time of year, as shown in a climatic atlas or on the appropriate chartlets in the meteorological text of this Pilot, suspicion should be aroused and action taken to meet any development, such as raising steam in any available additional boilers, &c. It should be noted, however, that the barometer reading must be corrected not only for height, latitude, temperature and index error (if mercurial), or for height and index error if aneroid, but also for diurnal variation, the amount of which is given for each hour of the day in the Air Ministry climatic atlases and in the meteorological text of this Pilot. If the reading thus corrected is 5 mb. or more below normal, it is time to take avoiding action for there can be little doubt that a tropical storm is in the vicinity. According to an analysis of observations in the Western Pacific the centre of the storm is then probably not more than 200 miles away. At this distance, at any rate in the China Sea vicinity, the wind has usually increased to about force 6.

When proceeding through an area liable to be visited by these storms it is desirable to take hourly readings of the barometer.

(*b*) An appreciable change in the direction and/or strength of the wind.

(*c*) A swell is sometimes evident, proceeding from a direction that approximates to the bearing of the centre. If ahead of the storm this indication may be apparent before the barometer begins to fall.

(*d*) Extensive cirrus cloud followed, as the storm becomes closer, by much alto-stratus cloud and subsequently fracto-cumulus or "scud."

(*e*) In addition there is the warning that can be given by Radar. The existence of moderate or heavy rain can usually, under favourable meteorological conditions, be detected at the extreme range of centrimetric radar, such as is normally used for navigational purposes afloat, depending on the vertical extent of the rainfall. Subrefraction might decrease and superrefraction increase this range as with any other target. Although moderate or heavy rain does not fall symmetrically all round a storm, it is continuous for at least 50 miles in a broad sector extending from the " eye " of the storm where there is a circular area of relatively light winds and clear or partially clear sky. By the time radar evidence of the exact position of the storm is available, the ship will probably be already in fairly high seas and experiencing winds of force 9 or 10. There should still be time, however, for her to avoid the centre of the storm.

Note.—In accordance with Article 35 of the International Convention for Safety of Life at sea it is the duty of every ship who suspects the presence or formation of a tropical revolving storm immediately to inform other vessels and shore authorities with all the means at her disposal. Weather reports should be made by radio at frequent intervals giving as much information as possible, especially corrected (*not* for diurnal variation as in (*a*) above) barometer readings. If barometer readings are uncorrected this fact should be stated in the signal.

Information required by the seaman before deciding upon action to be taken.—To decide on the best course of action if a storm is suspected to be in the vicinity, the mariner requires to know :—

(*a*) the bearing of the centre of the storm ;
(*b*) the semicircle in which the ship is situated ;
(*c*) the path of the storm.

If an observer faces the wind, the centre of the storm will be from 9 to 11 points on his right-hand side in the northern hemisphere when the storm is about 200 miles away, i.e., when the barometer has fallen about 5 millibars and the wind has increased to force 6 or thereabouts; as a rule the nearer one is to the centre the more nearly does the angular displacement of the wind approach 8 points. A further check on the bearing of the centre may often be obtained by noting the direction from which the swell is coming. The swell travels approximately directly outward from the storm centre.

The semicircle in which the ship is situated can be determined by taking two such bearings with an interval of from two to three hours between observations, provided that allowance is made for the ship's movement. It can be assumed that the storm is not travelling towards the equator; and, if in a lower latitude than 20°, its path is most unlikely to have an easterly component; and, on the rare occasions when neither of these statements applies, the storm is moving very slowly. (Exceptions to this are most likely in the South Pacific, where occasional storms often move off on a course almost due south developing an easterly component at a latitude of about 15°, and in the western North Pacific where some of the out-of-season storms may recurve at an early stage.)

In a moving ship associated with a storm progressing at an unknown rate, it is very difficult to estimate from an apparent shift of wind the direction and speed of the storm's motion relative to the ship. The surest method of ascertaining the true shift of wind and thereby finding out in which semicircle the vessel is situated, *is to stop the ship during the period between the two bearings*. If in either hemisphere, these observations show that the wind is veering, the ship is in the right-hand semicircle; if the wind is backing she is in the left-hand semicircle; and if the wind remains steady in direction then the vessel is in the direct path of the storm, which is the most dangerous place of all.

The diagram headed "Typical Paths of Tropical Storms" (at the end of this article) illustrates the terms "dangerous semicircle" and "navigable semicircle." The former lies on the side of the path towards the usual direction of recurvature, i.e., the right-hand semicircle in the northern and the left-hand semicircle in the southern hemisphere. It is so called because a sailing or low-powered vessel caught in it may be blown towards the path along which the storm will pass, or the storm may recurve and the centre pass over her. The navigable semicircle is that which lies on the other side of the path. A ship situated within this semicircle will tend to be blown away from the storm centre, and the recurvature of the storm will increase her distance from the centre.

Practical rules for avoiding tropical storms.—In whatever situation a ship may find herself, the matter of vital importance is to avoid passing within 50 miles or so of the centre of the storm; it is preferable to keep outside a radius of 200 miles or more, because at this distance the wind does not often exceed force 7 (and is generally not more than force 6), and freedom of manœuvre is maintained. If a ship has at least 20 knots at her disposal, and shapes a course that will take her most rapidly away from the storm before the wind has increased above the point at which her movement becomes restricted, it is seldom that she will come to any harm.

Sometimes a tropical storm moves so slowly that a vessel, if ahead of it, can easily outpace it or, if astern of it, can overtake it. Since, however, she is unlikely to feel seriously the effects of a storm so long as the barometer does not fall more than 5 mb. (corrected for diurnal variation) below the normal, it is recommended that frequent readings should be made if the presence of a storm in the vicinity is suspected or known, and that the vessel should continue on her course until the barometer has fallen 5 mb., or the wind has increased to force 6 when the barometer has fallen at least 3 mb. If and when either of these events occurs, she should act as recommended in the following paragraphs, until the barometer has risen above the limit just given, and the wind has decreased below force 6. Should it be certain, however, that the vessel is behind the storm, or in the navigable semicircle, it will evidently be sufficient to alter course away from the centre.

In the northern hemisphere.—(*a*) If the wind is veering, the ship must be in the dangerous semicircle. A steam or other power-driven vessel should proceed with all available speed with the wind 1 to 4 points (depending upon her speed) on the starboard bow, and should subsequently haul round to starboard as the wind veers, thereby tracing a course relative to the storm as shown by the pecked line in the diagram. If a steamer has insufficient room to make much headway when in the dangerous semicircle she should heave to in the most comfortable position relative to the wind, preferably with the wind on her starboard bow so that she is heading away from the centre of the storm.

(*b*) If the wind remains steady in direction, or if it backs, so that the ship seems to be nearly in the path (it is sometimes difficult to determine satisfactorily if indeed the ship is nearly in the path, particularly if in the dangerous semicircle, because the wind does not always behave according to rule) or in the navigable semicircle respectively, a steam vessel should bring the wind well on the starboard quarter and proceed with all available speed, subsequently altering course to port as the wind backs, thus tracing a course relative to the storm as shown by the pecked line in the diagram.

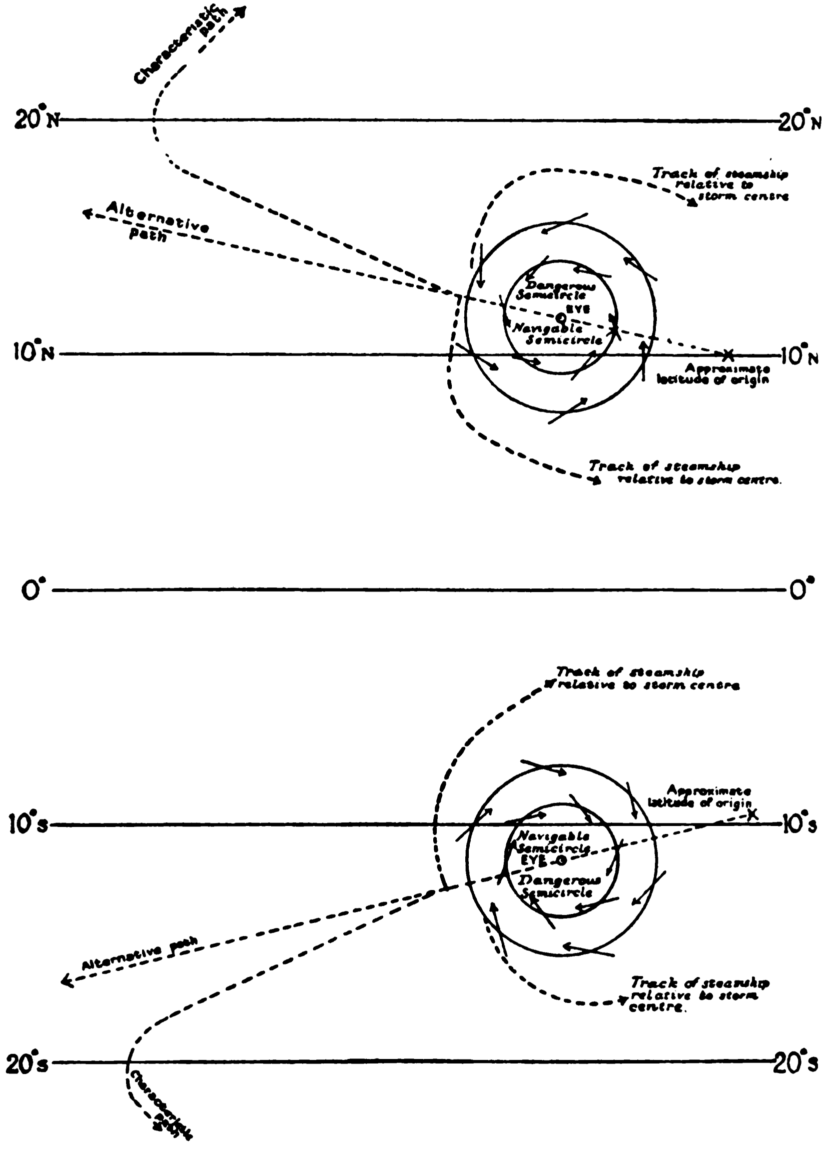
In the southern hemisphere.—(*a*) If the wind is backing, the ship must be in the dangerous semicircle. A steam or other power-driven vessel should proceed with all available speed with the wind 1 to 4 points (depending upon her speed) on the port bow, and should subsequently haul round to port as the wind backs, thereby tracing a course relative to the storm, as shown by the pecked line in the diagram. If a steamer has insufficient room to make such headway she should heave-to in the most comfortable position relative to the wind, preferably with the wind on her port bow so that she is heading away from the centre of the storm.

(*b*) If the wind remains steady in direction, or if it veers, so that the ship seems to be nearly in the path (it is sometimes difficult to determine satisfactorily if indeed the ship is nearly in the path, particularly if in the dangerous semicircle, because the wind does not always behave according to rule) or in the navigable semicircle respectively, a steam vessel should bring the wind well on the port quarter and proceed with all available speed, subsequently altering course to starboard as the wind veers, thus tracing a course relative to the storm as shown by the pecked line in the diagram.

If there is insufficient room to run when in the navigable semicircle, and it is not practicable to seek a safe and effective shelter before the storm begins to be felt, a vessel should heave-to in the most comfortable position relative to the wind and sea, bearing in mind the proximity of land.

If a ship finds that she is in the direct path of the storm and has no room to run into the navigable semicircle as directed above, it should be considered, bearing in mind possible recurvature, whether she should endeavour to make her way into the " dangerous " semicircle (where

TYPICAL PATHS OF TROPICAL STORMS


Characteristic path
20°N
20°N
Track of steamship relative to storm centre
Alternative path
Dangerous Semicircle
EYE
Navigable Semicircle
10°N
10°N
Approximate latitude of origin
Track of steamship relative to storm centre.
0°
0°
Track of steamship relative to storm centre
Approximate latitude of origin
10°S
10°S
Navigable Semicircle
EYE
Dangerous Semicircle
Alternative path
Track of steamship relative to storm centre.
20°S
20°S
Characteristic path

Note.—In this diagram the isobars are shown as concentric circles about the eye; in practice this is usually the case within 150 miles or so of the centre. Outside this distance the isobaric form often loses its symmetry and strong winds often extend farther on the polar side than on the equatorial.

she may at least be better off than remaining in the direct path of the storm) and continue to steam to windward as fast as she can so as to get as far as possible from the centre.

If in harbour, or at anchor, a seaman should be just as careful as at sea in watching the shifting of the wind and estimating the movement of the storm relative to himself, so that he may consider shifting his berth with advantage or otherwise act according to circumstances. It is usually preferable, however, to put to sea if this can be done in sufficient time to avoid the worst of the storm. Riding out a tropical storm, the centre of which passes within 50 miles or so, in a harbour or anchorage, even if some shelter is offered, is an extremely unpleasant and hazardous experience, especially if there are other ships in company. Even if berthed alongside, or with special moorings and long bridles in use, a ship cannot feel entirely secure.

Discretion must, of course, be used. In the case of a low-powered or small vessel with, for example, insufficient warning to enable her to gain sufficient distance from the storm by putting out to sea, it will be preferable to remain in a reasonably sheltered harbour. If at sea and warning of an approaching storm is given and there is considered to be insufficient time or sea room to avoid the dangerous part of the storm area, it may be advisable for vessels of this type to seek shelter. In the China Sea, for example, there are so-called typhoon harbours which are listed in the Admiralty Pilot. In all cases, however, the mariner must use seamanship and initiative.

(3) **Local modification of the weather near the coast.**—The information given in Chapter I on climate and weather in the area covered by the Pilot refers necessarily to the coastal and sea regions generally but cannot attempt to deal with the local effects on the wind and weather of each separate headland, bay, or creek. The following notes, however, should prove helpful in showing how the weather in the general vicinity is likely to be modified by the topography or shape of the land close to the actual place in which the mariner is concerned.

(i) If the coastline is steep-to, onshore winds that approach it at an angle are usually deflected nearly along the shore and increased somewhat in speed. And when the wind approaches a strait whose direction is somewhat similar to that of the wind, the wind tends to blow along the strait and increases in speed as the strait narrows.

When a strong wind blows directly towards a very steep coast, there is usually a narrow belt of contrary gusty winds close to the coast.

(ii) Similarly when the wind blows onshore towards the entrance to a wide estuary, especially one with hills on both sides, it generally tends to blow up the estuary. This effect is most marked in the afternoon but there is often no such tendency during the night and early morning.

(iii) An offshore wind is often squally on the lee side of hilly coasts, especially when the air is much colder than the sea, as for example when it blows off snow-covered land and when the wind over the open sea is force 5 or more.

(iv) Near headlands or islands with steep cliffs there may be large changes in direction (up to about 90°) and speed of the wind in addition to those mentioned above.

(v) During quiet and warm weather with clear or fairly clear skies, a sea breeze is of common occurrence during the warmer part of the day; it is especially frequent in the tropics and subtropics. It blows onshore from, on the average, 4 to 8 hours after sunrise until shortly before sunset, reaching its maximum development during the afternoon (1300 to 1600); if there is an appreciable regional or general wind, then this will be modified by the onshore sea breeze. Under particularly favourable circumstances such as high dry temperatures, relatively cool sea, and hilly background to coast, the sea breeze may blow as much as force 4 (occasionally 5) and extend 20 miles or more to seaward from the shore. At night under similar circumstances a lighter breeze blows from the land to the sea; it seldom extends more than 5 miles from the shore nor does it become appreciable much before 2200 local time; under favourable conditions, as in the tropics, it usually lasts until an hour or so after sunrise.

(vi) When sea fog that is caused by the passage of warm air over a colder sea surface is general over the open sea, visibility is better close to leeward of a hilly island or promontory than to windward. This effect is most marked in late spring and summer, during the early afternoon when the land is at its warmest, and then applies to low-lying land as well.

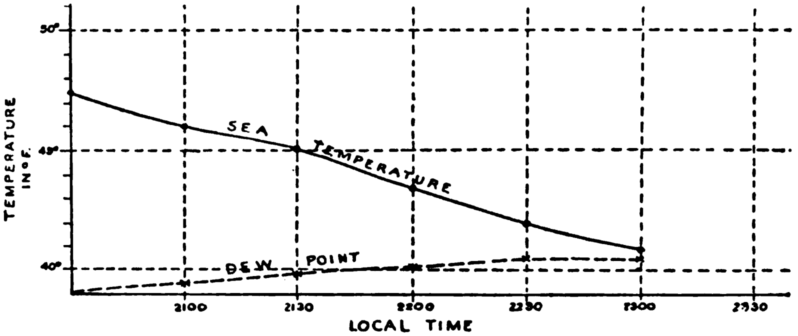
(vii) Radiation fog which forms over land on quiet nights with clear skies, mainly in autumn and winter, and sometimes spreads a few miles out to sea, is least thick during the afternoon and is often worst during the first hour or two after sunrise.

(4) **Forecasting sea fog.**—The most frequent type of fog in the open sea is that caused by relatively warm air flowing over a colder sea. Warning of this type of fog may be obtained by frequent observations of air and sea surface temperatures; if the sea temperature falls below the dewpoint of the air, fog is almost a certainty. The following procedure is recommended whenever the temperature of the air is higher than, or about equal to, that of the sea, especially at night when approaching fog cannot be seen until shortly before entering it.

Sea and air (both dry and wet bulb) temperatures should be observed at intervals of about 5 miles and the sea temperature plotted against dewpoint. The dewpoint is obtainable from tables published in various text-books, but at temperatures up to about 60° F. a close enough approximation may be obtained by assuming it to be the same amount below the wet-bulb temperature as the latter is below the dry-bulb temperature; for example, if the dry bulb reads 50° F. and the wet bulb 48°, the dewpoint is about 46°. If the curves of sea temperature and dewpoint converge, fog may be expected by the time at which they coincide.

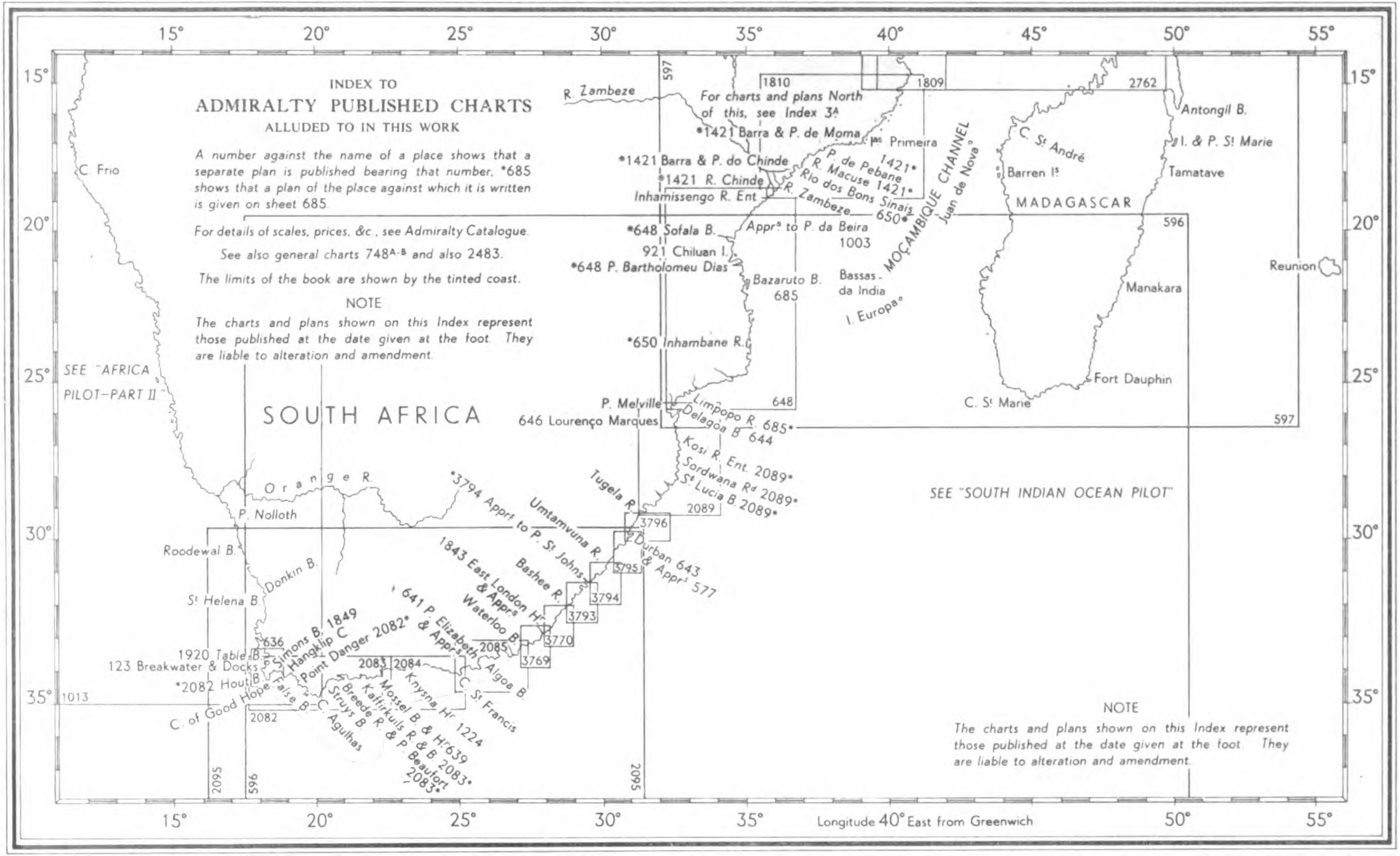
The figure on the next page represents conditions that might be found by a low-powered ship in about long. 40° W. proceeding westward on the appropriate lane route for Halifax, Nova Scotia. At 2200 it would become evident that there is a probability of running into fog in about an hour's time, assuming that the sea temperature continues to fall at about the same rate that it has done during the last 1½ hours.

From the appropriate chart of average sea surface temperatures it can be seen where a rapid fall of temperature may be expected, so that if the dewpoint is within 5° or so of the sea temperature when approaching the colder water zone, this will also give a fairly reliable warning of fog.



If it is desirable and practicable to escape from fog, a ship should steer for warmer water which will again be evident from the charted isotherms.

Fog, or very poor visibility, at sea may also occur in snow or heavy rain, or in association with the passage of a warm front or occlusion, or, when within 20 miles or so of land, it may occur as a result of radiation fog extending from the land; in high latitudes in winter, sea smoke may be met near land, when very cold offshore winds are blowing, or near extensive ice. The method described above will not give warning of these fogs, of which frontal fogs, though common in middle latitudes, are neither so extensive nor so persistent in any one locality, and the other fogs mentioned are rarely encountered far from land (or extensive ice).



INDEX TO

ADMIRALTY PUBLISHED CHARTS

ALLUDED TO IN THIS WORK

A number against the name of a place shows that a separate plan is published bearing that number. *685 shows that a plan of the place against which it is written is given on sheet 685.

For details of scales, prices, &c., see Admiralty Catalogue.

See also general charts 748A-B and also 2483.

The limits of the book are shown by the tinted coast.

NOTE

The charts and plans shown on this Index represent those published at the date given at the foot. They are liable to alteration and amendment.

NOTE

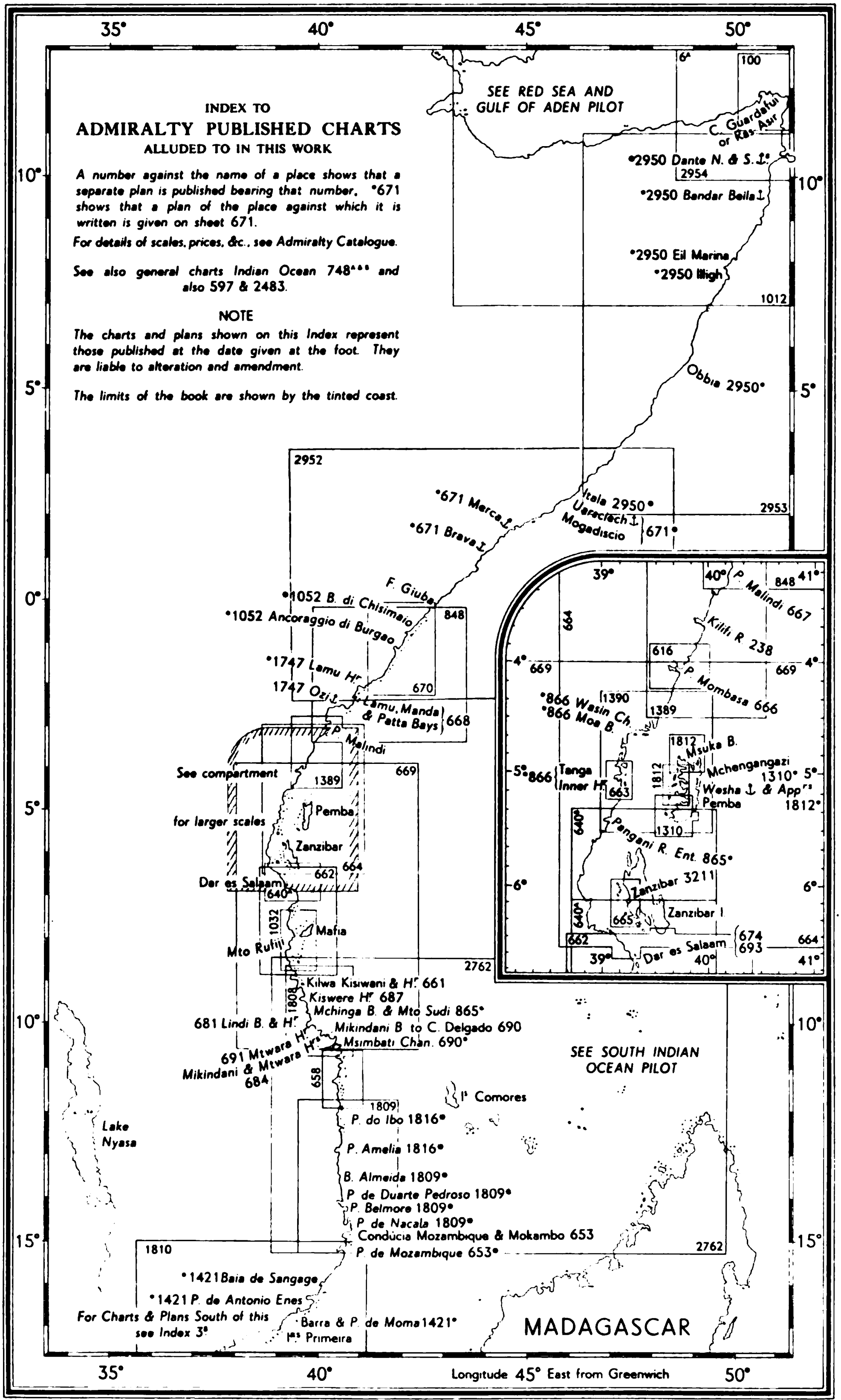
The charts and plans shown on this Index represent those published at the date given at the foot. They are liable to alteration and amendment.

Africa Pilot. Vol III
C.B.H 24957

December 1953.

Z.'en 1953

S.D.3B



INDEX TO
ADMIRALTY PUBLISHED CHARTS
ALLUDED TO IN THIS WORK

A number against the name of a place shows that a separate plan is published bearing that number. •671 shows that a plan of the place against which it is written is given on sheet 671.

For details of scales, prices, &c., see Admiralty Catalogue.

*See also general charts Indian Ocean 748*** and also 597 & 2483.*

NOTE

The charts and plans shown on this Index represent those published at the date given at the foot. They are liable to alteration and amendment.

The limits of the book are shown by the tinted coast.

IMPORTANT.

Details of Lights, Fog Signals, and Time Signals (visual) are not included in this volume; for this information the Admiralty List of Lights, Vols. 6 and 10, should be consulted.

Information regarding Vertical Movement of the Water is not included; for this the Admiralty Tide Tables should be consulted.

Details of Radio information (weather bulletins, storm and navigational warnings, time signals, fog signals, and D.F. stations) are not included; for this information the Admiralty List of Radio Signals should be consulted.

35°
40°

AFRICA PILOT

VOLUME III

CHAPTER I

GENERAL REMARKS—UNION OF SOUTH AFRICA—PORTUGUESE EAST AFRICA OR MOÇAMBIQUE—BRITISH EAST AFRICA—TANGANYIKA TERRITORY—ZANZIBAR PROTECTORATE—KENYA COLONY AND PROTECTORATE — SOMALIA — CURRENTS — TIDAL STREAMS — ICE — SIGNALS — LIFE-SAVING—LOCAL MAGNETIC ANOMALIES—AIR LIGHTS—SUBMARINE CABLES — BUOYAGE — PILOTAGE — COMMUNICATIONS — STANDARD AND SUMMER TIMES — FUEL—REPAIRS—BRITISH CONSULAR OFFICERS—REGULATIONS — QUARANTINE — DERATISATION — PASSAGES — CLIMATE AND WEATHER—CLIMATIC TABLES

Charts 596, 597.

GENERAL REMARKS.—This work contains a description of the south, south-east and east coasts of Africa, from Table bay to Ras Hafun, and contains the following political divisions :—

The Union of South Africa, which extends as far northward as lat. 26° 52′ S., about one mile northward of the mouth of the Kosi river, and includes the Cape of Good Hope Province, the coast of which extends to the mouth of the Umtamvuna river in long. 30° 12′ E., and Natal Province, which, with Zululand, extends north-eastward to the boundary separating it from Portuguese territory.

Portuguese East Africa, or Moçambique, which extends north-eastward from its boundary with the Union of South Africa, to its boundary with the former British Mandated territory of Tanganyika, at the mouth of Mto Ruvúma in lat. 10° 28′ S.

Tanganyika, which extends from the mouth of Mto Ruvúma to the mouth of Mto Yimbo, in lat. 4° 41′ S., and includes Mafia and the adjacent islands.

Zanzibar Protectorate, which includes the islands of Zanzibar and Pemba, lying off the coast of Tanganyika.

Kenya Colony and Protectorate, which extends from the mouth of Mto Yimbo to its boundary with Somalia, a position on the coast in lat. 1° 40′ S., about 2 miles south-westward of Ras Chiambone (Dick's head).

Somalia, which extends north-eastward from its boundary with Kenya as far as and beyond Ras Hafun, in lat. 10° 28′ N., which is the northernmost position described in this work.

Charts 2202a, 748a, 748b, 2203, 2127, 2483.

Chart 2095.

UNION OF SOUTH AFRICA.—General Remarks.—The government of the Union of South Africa is constituted under the South Africa Act of 1909, the self-governing colonies of the Cape of Good Hope, the Transvaal, and Orange River Colony being united under one government in 1910, these colonies becoming original provinces of the Union under the names of the Cape of Good Hope, Natal, the Transvaal, and the Orange Free State. The seat of the Government is at Pretoria, and that of the Legislature at Cape Town. The executive is vested in a Governor-General, appointed by the Sovereign, aided by an Executive Council, with a Legislature of two Houses.

The total area of the Union is 472,494 square miles, divided between the provinces as follows :—The Cape of Good Hope, 277,113 ; Natal, 35,284 ; the Transvaal, 110,450 ; the Orange Free State, 49,647.

In 1951, the total population of the Union, by census was 12,646,375, of which 2,643,187 were Europeans ; of the non-European population in 1951, 8,535,341 were Bantu, 365,524 Asiatic and 1,402,323 of other mixed races.

On 25th December, 1947, the Union formally took possession of Prince Edward island (*Lat. 46° 36′ S., Long. 37° 57′ E.*) ; and on 30th December, 1947, of Marion island (*Lat. 46° 52′ S., Long. 37° 45′ E.*), about 1,200 miles south-eastward of the Cape of Good Hope, *see* Antarctic Pilot.

Natives.—The Bushmen are the earliest known inhabitants of South Africa. They are of the lowest type of humanity and frequented the Kalahari desert, Namaqualand and Damaraland ; the few that remain are to be found in Calvinia, Kenhardt and Namaqualand. They are small in stature and their life is more that of animals than men. Their language appears to be one of sound rather than articulation. Their inveterate enemies were the Hottentots and Bechuanas, who did their best to exterminate them long before the arrival of Europeans.

The Hottentots at one time dominated the country, their habits being nomadic and pastoral. Their origin is unknown, but they were fully established in the fifteenth century. The pure Hottentots are now nearly extinct.

The Griquas are the result of contact between the Hottentots and the Kaffirs and Boers. Although a mixed race, they are the descendants of the Hottentot line, and retain their tribal organisations. In appearance they are thin and wiry, of medium height, pale yellow colour, high cheek-bones and flat noses. From their hereditary pastoral temperaments, they make good farm servants, etc.

The native population of the eastern districts are the Kaffirs of the Amaxosa tribe, one of the four great tribes which were found by Europeans in 1688 inhabiting the country between the Cape and Natal. The Kaffirs are a fine, tall, muscular, intelligent race, rather of a vain and generally indolent disposition. They are an agricultural and pastoral people, but also manufacture articles in wood, iron and fibre. Superstitious tales take the place of religion.

Trade.—Produce.—Currency.—Weights and Measures.—The principal product of the Union is gold, but diamonds and other minerals are produced. As regards exports, gold takes first place, wool comes next, then diamonds, and hides and skins ; other commodities exported are sugar, fruit, bark, coal, angora hair, fish, meats, tobacco, wines,

Charts 596, 2202a, 748a, 2203, 2127, 2483.

Chart 2095.

ostrich feathers, and butter and butter substitutes. A considerable proportion of the imports are represented by textiles and wearing apparel; other important imports are hardware, machinery and vehicles.

The currency of the Union is similar to that of Great Britain, but accounts are sometimes kept in schillings, equal to 2¼*d.*, and rixdollars, equal to 1*s.* 6*d.*

In 1922, an act was passed which legalised the optional use of either the metric or the imperial weights and measures, but under a Proclamation of 1923, the " cwt." has been replaced by the " cental " of 100 lbs. The following old Dutch measures are also often used:—

Morgen = 2·11654 acres.
1,000 Cape lineal feet = 1,033 British imperial feet.
Leaguer = about 128 imperial gallons.
Half aum = 15½ imperial gallons.
Anker = 7½ imperial gallons.
Muid = 3 bushels.

Shipping.—In 1949–50, 10,356 vessels of all categories, with a total gross tonnage of 42,408,123, entered the ports of the Union.

Guano.—This fertiliser is obtained from a number of Government guano islands situated on the western and southern coasts of South Africa. Regulations regarding these islands are promulgated in Union Government Proclamation No. 158 of 1936, which states that landing on the islands without a permit is prohibited, and also that, in the territorial waters of the Union, it is forbidden to kill or disturb seabirds or to take their eggs. The killing or capture of seals is also prohibited, except at certain times of the year with the necessary permit.

The islands included in this publication are as follows:—Duiker island and Seal island (False bay). For a list of the remainder, *see* Africa Pilot, Volume II.

Communications.—The railways are state-owned and are under the administration of the Ministry of Railways and Harbours. In 1950, there was a total of 13,329 miles of railways, as well as road motor services with a route mileage of over 25,000 miles.

Cape Town, Mossel bay, Port Elizabeth, East London, Durban, Simonstown, Knysna, Port Alfred and Port Shepstone are all connected to the general railway system and there is direct railway communication between the Union and Lourenço Marques and Beira via the Rhodesias and the Bechuanaland Protectorate.

An internal airways system is operated by South African Airways and trunk air lines connect regularly with East and West Africa and Europe.

All the ports and towns on the coast and most of the villages are connected to the general telegraph and telephone system.

Cape of Good Hope Province.—General remarks.—The Cape of Good Hope, strictly speaking, is the small promontory at the southern end of the Cape peninsula, which forms the south-western extremity of the Continent of Africa.

The Cape of Good Hope Province is an extensive area bounded on the west, south and east by the Atlantic and Indian oceans. On the north it is bounded by the Orange river from the coast as far as the meridian of 20° E., thence the province is bounded by the Bechuanaland protectorate, the Transvaal, the Orange Free State, Basutoland and

Charts 596, 2202a, 748a, 2203, 2127, 2483.

Chart 2095.

Natal. It has a coastline of about 1,200 miles and an area of 277,113 square miles, including the 374 square miles of Walvis bay.

In 1951, the population of the province was 4,417,330 of all races. Owing probably to the uniformity of its temperature, the climate is healthy and is much favoured by Europeans suffering from pulmonary complaints. The western coast of the province, northward of Table bay, is described in Africa Pilot, Volume II.

The Cape of Good Hope was discovered in 1486 by Bartolomeu Dias, who named it Cabo Tormentoso or Stormy cape, but King John II. of Portugal, convinced that it was the turning point of the long desired road to India, gave it the name of Boa Esperança or Cape of Good Hope; his convictions were confirmed eleven years later by Vasco da Gama, who then rounded the cape and landed in what is now Natal.

In 1652, the territory was colonised by the Dutch East India Company, and it continued in their possession until 1795, when the British Government took possession, but at the peace of Amiens, in 1802, the colony was ceded to its former possessors. In 1806, it was again taken by the British, and its possession confirmed at the general peace in 1814, since when it has continued to be a part of the British Commonwealth.

Physical features.—The country directly southward of the Orange river consists of a series of three terraces divided by mountain ranges varying in elevation from 4,000 (1,219^{m}2) to 8,000 feet (2,438^{m}4), and rising gradually in a series of open sterile plains from the river as far as the parallel of lat. 32° 00′ S., whence it gradually declines from north to south; the culminating point is the Spitzkoss or Compass berg; the passages from one plateau to another are by well-made passes through the narrow and difficult gorges or kloofs. One of these plateaux is known as the Great Karroo, and is 300 miles in length, east and west, with a breadth of 70 miles; its chief characteristic is the absence of running water during the greater part of the year, so that during that time it is, as its name implies, a dry barren district but immediately after heavy rain the whole area is covered by a profuse and varied vegetation. The country to the north is still more elevated and forms part of the great South African plateau. For the most part, the eastern and southern portions of the province receive an abundant water supply, are well wooded, and extremely fertile.

The south-western part of the province produces grain and wine, in the southern part forests exist, and in the south-eastern parts tobacco and maize are cultivated.

The principal mountain ranges are Olifants Zitzikama, the summit of which is Great Winterhoek, 6,818 feet (2,078^{m}1); Groote Zwarte bergen, its highest peak being Cockscomb mountain, 5,773 feet (1,759^{m}6); and the Roggeveld Sneeux Bergen range, having Compass berg, 8,209 feet (2,502^{m}1), the highest peak in the colony, for its apex.

The rivers, although numerous, are practically useless for either navigation or irrigation, most of them flowing through deep and precipitous ravines, and being, except when swollen by rains, mere shallow torrents. Bars, which front the mouths of the largest, in most cases make entrance both difficult and dangerous, but some of these have been rendered navigable. The principal rivers are the Orange and the Olifants rivers, the former rising near Mont aux Sources, in Basutoland, and draining about 400,000 square miles of country.

Charts 596, 2202a, 748a, 2203, 2127, 2483.

Chart 2095.

Flora.—Fauna.—South Africa is greatly destitute of forest except in the lower valleys and coastal regions. In the plains the fleshy, leafless, contorted species of kapsias, mesembryanthemums, aloes, and other succulent plants are found, and there is also some valuable timber, the trees being yellow pine (*Podocarpus elongatus*), stinkwood (*Ocotea*), sneezewood or Cape ebony (*Pteroxylon utile*), and ironwood. Extensive miniature woods or heaths are found in endless variety, covered throughout the greater part of the year with innumerable blossoms, red being prevalent; alfa, the most abundant of all the grasses, grows in the plateau of the Atlas range.

The indigenous animals are fast disappearing, but buffaloes are found on the south coast, and the springbok is abundant. The ostrich, the secretary bird, the francolin, and the guinea fowl are common, while the weaver bird is found in the southern part. Amongst reptiles are a number of venomous snakes. The bite of the tsetse fly is fatal to most animals.

Products.—The principal products of the province are minerals, including diamonds, copper, coal, tin and gold, oats; wool, Kaffir corn barley and rye are also produced. Large numbers of horses, cattle, sheep and ostriches are reared; the south-western part of the province produces grain and wine; in the southern part, valuable forests are extensively worked for timber and in the south-eastern parts, tobacco and maize are cultivated.

Ports.—With the exception of Saldanha bay, situated on the western coast and described in Africa Pilot, Volume II, and Simon's bay, there are no natural harbours or sheltered anchorages for large vessels, and the coast being exposed to the ocean swell, is dangerous, especially for sailing vessels. Good harbours, with artificial protection, have been constructed at Table bay, Simons bay, Mossel bay, Port Elizabeth and East London.

Charts 2095, 596.

Natal.—General remarks.—Natal Province, which includes Zululand, has an area of 35,284 square miles and a coastline of about 360 miles which extends north-eastward from the mouth of the Umtamvuna river to a position on the coast about one mile northward of the mouth of the Kosi river. In 1951, the total population of the province was 2,408,433. The climate of the sea coast although almost tropical, is extremely healthy.

Deriving its name from having been discovered on Christmas day, 1497, by the Portuguese navigator Vasco da Gama, Natal was first settled in 1824 by a small party of British subjects who landed on the coast where Durban now stands, but two unsuccessful attempts at forming a colony were previously made by the Dutch. At the time of its settlement, the country formed part of the great Zulu Kingdom under T'Chaka.

Between 1835 and 1837, large parties of Dutch Boers from what was then Cape Colony, trekked across country and established themselves in the northern part of Natal, where, to this day, Boers still predominate. In 1844, Natal was proclaimed British and was annexed to Cape Colony but in 1856, it was made a separate colony with representative institutions, and in 1893, acquired responsible government. The province of Zululand was annexed to Natal in 1897, and in 1910, Natal became part of the Union of South Africa.

Charts 596, 2202a, 748a, 2203, 2127, 2483.

Charts 2095, 596.

Physical features.—Within the coast of Natal the country rises to an altitude of about 12,000 feet (3,657^{m}6) in little more than 100 miles, forming a series of five almost regular steppes; the first of these extends about 14 miles inland and attains an elevation of about 1,000 feet (304^{m}8); the second steppe, with a width of about 20 miles, is about 2,500 feet (762^{m}0) high; the third, about 25 miles in width, is about 3,700 feet (1,127^{m}8) high; the fourth, about the same width as the third, is about 5,000 feet (1,524^{m}0) high; the fifth and last, attains an elevation of about 6,000 feet (1,828^{m}8) and contains the peaks of the Drakensberg range, some of which are from 10,000 to 12,000 feet (3,048^{m}0 to 3,657^{m}6) high, and are frequently covered with snow. Between the slopes of the Drakensberg range, the province has pastoral lowlands and rich agricultural land, and in many parts the scenery is extremely picturesque.

The principal rivers are the Umzimkulu, the Umkomaas and the Tugela, which all traverse the province from their source in the Drakensberg range, but only the two latter are navigable and that only by small craft for a short distance. The Tugela river enters the sea about 45 miles north-eastward of Durban and is said to be the most picturesque of the Natal rivers; its falls, about 1,800 feet (548^{m}6) in height, are comparable to the Victoria falls on the Zambezi river. Over 30 less important rivers, none of which are navigable, enter the sea on the Natal coast.

Products.—The coastal region, extending about 15 miles inland, is highly fertile, and sugar, coffee, tea, indigo, arrow root, ginger, tobacco, rice, pepper and cotton thrive well, while pineapples ripen in the open air. The midland district is more adapted to cereals and other European crops, and the upper district is chiefly grazing land where sheep, goats, pigs, cattle and horses are reared.

The following are the principal products:—Coal, wool, sugar, maize, bark, skins and hides, tea and whale products. Coal is the chief mineral product; salt is produced and there are beds of iron ore. Small quantities of copper and gold are also produced.

There is a whaling industry based on Durban.

Ports.—The artificial harbour of Durban, which is completely landlocked, is the only harbour available for large vessels on the coast of Natal.

Charts 596, 597.

PORTUGUESE EAST AFRICA OR MOÇAMBIQUE.—General remarks.—The coast of Portuguese East Africa or Moçambique, about 1,430 miles in length, extends from the northern boundary of Natal, about one mile northward of the mouth of the Kosi river, to the mouth of Mto Ruvúma, in about lat. 10° 28′ S. It is bounded on the south by Natal, on the west by Swaziland, the Transvaal and Southern Rhodesia and on the north by Northern Rhodesia, Nyasaland, and Tanganyika.

Moçambique, with an area of 297,657 square miles, is now administered by the state. On 19th July 1942, the state took over the territory of Manica and Sofala as a fourth district of the province.

The other three districts are Sul do Save, Zambézia and Niassa. Lourenço Marques is the capital of the province.

There is a government council composed of officials and elected

Charts 748a, 748b, 2483.

representatives of the commercial, industrial, and agricultural classes, and also an executive council.

In 1950, the population of the province according to the census of 1950 was 5,732,767.

Portuguese East Africa or Moçambique was discovered by Vasco da Gama in 1498, and was first colonised in 1505. By their early occupation of South-east Africa, the Portuguese were able to secure most of the ports formerly used by the old Arab traders, that of Lourenço Marques being added to the rest by arbitration in 1871, when Great Britain was awarded the prior right of purchase over any other nation.

Nearly the whole of the coast between Baía de Lourenço Marques and Cabo Delgado consists of marshy land, and immense quantities of decayed vegetable matter are brought down by the large rivers, particularly in Baía de Lourenço Marques and in the delta of Rio Zambeze, so that the exhalations produced by the powerful sun, the heavy rains which succeed the great heat, and the nightly dews, all tend towards the general insalubrity of this coast and malaria is endemic; the upper plateaux inland, however, are cool and healthy.

Inhambane is considered to be the least unhealthy of the ports on this coast, but from November to May fevers are very common, the best safeguard against them being temperate living and non-exposure to the hot sun.

Physical features.—There is a marked difference in the coast between the southern and northern parts of Moçambique. Southward of Porto de Moçambique, the coast is generally low, sandy and lined with mangroves, with few and poor harbours, while northward of that port, the coast becomes considerably indented, with rocky headlands and rugged cliffs, and is fringed by an almost continuous chain of islands.

A mountain chain forms the backbone of the country and a steep declivity of the continental plain, but in the districts adjoining the lower part of Rio Zambeze and in some other parts, the country slopes gradually to the coast. The Lebombo mountains within Baía de Lourenço Marques, are only about 2,000 feet (609$^{\mathrm{m}}$6) high, but farther northward, mountains rise to nearly 8,000 feet (2,438$^{\mathrm{m}}$4) and the principal range is northward of Rio Zambeze, where Namuli peak, of the range of the same name, rises to 8,860 feet (2,700$^{\mathrm{m}}$5) high; Namuli peak and other mountains of about the same elevation, are covered by magnificent forests.

Near Lake Nyasa, a range attains an elevation of about 6,000 feet (1,828$^{\mathrm{m}}$8) with a steep descent to the lake; westward of the lake, the country forms a plateau from 2,000 to 2,500 feet (609$^{\mathrm{m}}$6 to 762$^{\mathrm{m}}$0) high.

There are numerous rivers some of which are navigable for light draught power vessels for a considerable distance. A notable feature of the country is the number of lateral waterways which connect the larger rivers, and, by using these, it is possible to make an inland voyage between Beira and Quelimane, a distance of over 300 miles.

The largest rivers are Rio Limpopo and Rio Zambeze. Rio Limpopo, rising in the mountains north-westward of Pretoria, flows between the Transvaal and Southern Rhodesia to Moçambique, and enters the sea about 60 miles north-eastward of Lourenço Marques after a course of about 1,000 miles; it is reported to be navigable for light draught power vessels for about 60 miles above its mouth.

Rio Zambeze, rising in the north-eastern part of Angola, flows through Northern Rhodesia and, after a course of about 2,000 miles, enters the sea in Moçambique through a delta which extends about 37 miles; it is joined by Rio Shiré at about 100 miles above its mouth. At about 950 miles from its mouth are the Victoria falls, which are about one mile in width and are said to be the most magnificent in the world. Rio Zambeze is navigable for light draught and stern-wheel vessels for a considerable distance, and Rio Shiré is also navigable, but both rivers are shallow in the dry season.

Products.—A considerable portion of the country is suitable for agriculture and the valley of Rio Zambeze is fertilised by the inundation of the river. The more important agricultural products are sugar, maize, copra, sisal, cotton, tobacco, beans, oil seeds, bananas, mangrove bark, ground nuts, cashew nuts, tea and rice. There are large herds of cattle and goats, flocks of sheep and fish are plentiful.

There are extensive deposits of coal and ironstone near Tete and Baía de Lourenço Marques; malachite and copper are found in the interior and gold mines are worked.

The principal exports are sugar, copra, sisal, ground nuts, cashew nuts, cotton, bananas, tea and vegetable oils, and the chief imports consist of textiles, coal, railway materials, agricultural and industrial machinery, iron and steel, motor vehicles, petrol, flour, rice, hardware, footwear and wines.

Ports.—The principal ports, enumerated from southward, are Lourenço Marques, Inhambane, Beira, Chinde, Quelimane, Macuse, Pebane, Antonio Enes, Porto de Moçambique, Porto Amelia, Ibo and Moçimboa da Praia. Both Lourenço Marques and Beira are ports of considerable importance, on account of their railway communication with the Transvaal and Rhodesia respectively. A new deep water harbour is being constructed at Nacala.

Currency.—Weights and Measures.—The currency of the territory is the Moçambique escudo, the par rate of which, in 1951, was 80$00. The metric system is in use.

Communications.—Railways.—With the exception of the Beira railway, the railways are State-owned and cover about 700 miles. The principal lines are as follows:—

Lourenço Marques to the Transvaal border, about 57 miles, joining with the South African Railways to form the main line to the Rand area; this is the most important line in the colony.

The Beira railway, linking Beira with the Rhodesias and the Union of South Africa; it is about 200 miles in length and forms part of the Rhodesian Railways system.

The Trans-Zambesia railway, 175 miles in length, from Dondo on the Beira railway to Murraca on the southern bank of Rio Zambeze. On the northern bank of Rio Zambeze, the Central African railway, 61 miles long, of which 45 are in Portuguese territory, connects at Port Herald with the Shiré Highlands railway. With the opening of the bridge across Rio Zambeze in 1935, these three railways give through connection between Salina on Lake Nyasa and Beira, a distance of 575 miles.

Charts 596, 597.

A railway to connect Porto de Moçambique to Nyasaland is under construction, and in 1951 about 312 miles had been completed. Short lines, serving the immediate hinterland, are also operated from the ports of Villa de João Belo (54 miles), Inhambane (55 miles) and Quelimane (87 miles).

Railways to open up the valley of Rio Limpopo and the fertile district of Tete, are also projected.

Air.—A regular air service is maintained between Lourenço Marques, Moçimboa da Praia, Tete, Johannesburg, Salisbury and Durban. In 1947, a fortnightly service was introduced between Lisbon and Lourenço Marques viâ Casablanca, Luanda and Salisbury.

Chart 597.

BRITISH EAST AFRICA.—High Commission.—The East African High Commission, which consists of the Governors of Kenya, Tanganyika, and Uganda, came into being on the 1st January 1948 to provide for the administration of services common to the three territories, neither political federation nor fusion of the existing governments being involved.

Charts 669, 597.

TANGANYIKA TERRITORY.—General remarks.—The coast of Tanganyika Territory, about 500 miles in length, extends from the mouth of Mto Ruvúma in about lat. 10° 28′ S., to the mouth of Mto Yimbo in about lat. 4° 41′ S. The Territory includes Mafia and the other adjacent islands, and is bounded on the south by Moçambique; on the west by Nyasaland, Northern Rhodesia, Lake Tanganyika and the Belgian Mandated territory of Ruanda; and on the north by the Uganda Protectorate, Lake Victoria and Kenya Colony and Protectorate.

Tanganyika Territory comprises the former German East Africa with the exception of the districts of Ruanda and Urundi at its north-western extreme and the Kionga area, southward of Mto Ruvúma, which came under Belgian and Portuguese administration respectively in 1921 and 1919. The German East Africa Company founded several commercial stations in 1885 but these were destroyed by a native outbreak in 1889; commercial enterprise, however, was resumed in 1890.

The territory is now administered under United Nations trusteeship, the former League of Nations mandate having been terminated and replaced in 1946. It is administered by a Governor who is assisted by an Executive and a Legislative council, all of whose members are nominated. The seat of Government is Dar es Salaam, a modern town founded in 1862 by the Sultan of Zanzibar and occupied by the Germans in 1887. The second coastal town of importance is Tanga, the most important inland town being Tabora.

For administrative purposes, the Territory is divided into eight provinces, each of which is in charge of a Provincial Commissioner and is subdivided into over 50 districts each under a District Officer. The coastal provinces are Southern, which contains the coastal districts of Mikindani, Lindi and Kilwa; Eastern, which contains the coastal districts of Rufiji, Dar es Salaam and Bagamoyo, and Tanga, which contains the coastal district of the same name.

Charts 669, 597.

In 1949, the population of the territory was estimated at 7,405,903, of whom 16,045 were Europeans.

The semi-temperate regions of the mountainous areas, at altitudes of from 5,000 to 10,000 feet (1,524^{m}0 to 3,048^{m}0), enjoy a bracing climate and alone can be considered healthy for Europeans, but prolonged residence at these altitudes is apt to produce nervous strain, even though physical fitness is maintained.

Physical features.—Within the coast is a low plain, composed of coral partly covered with sand or with rich alluvial soil and dense bush or mangroves, and varying in width from 10 to 40 miles; behind the plain, the country rises gradually to a plateau which constitutes the greater part of the hinterland. This plateau falls sharply from a general level of about 4,000 feet (1,219^{m}2) to the level of the lakes, Tanganyika 2,590 feet (789^{m}4) and Nyasa 1,607 feet (489^{m}8), which lie in the trough of a deep, narrow gorge, known as Rift valley, which traverses the plateau.

The highest points in Tanganyika are the extinct volcanoes in the north-east; Kilimanjaro, about 19,600 feet (5,974^{m}1) high, and snow-capped, the highest peak in Africa, and Mount Meru, about 15,000 feet (4,572^{m}0) high, about 40 miles eastward of Kilimanjaro. In the south-west are the Livingstone mountains where the highest peak is over 9,000 feet (2,743^{m}2) high.

Lake Tanganyika, the median line of which forms part of the western boundary of Tanganyika, is about 350 miles in length, north and south, with a greatest width of about 45 miles; the greatest depth is 698 fathoms (1,276^{m}5).

The largest rivers are Mto Ruvúma and Mto Rufiji, both of which rise in the central plateau; the latter river enters the sea through an extensive delta about 40 miles in extent. Mto Pangani, which rises on the slopes of Kilimanjaro, enters the sea in the District of Tanga after a general south-easterly course of about 250 miles. Among other rivers are Mto Ruvu and Mto Wami, but all the rivers are shallow and scarcely navigable for any vessel larger than a power launch.

Products.—Agricultural products constitute the chief wealth of Tanganyika, the principal ones being sisal, cotton, coffee, ground nuts, copra, grain, sesame, tea, rice and tobacco. Gold is the principal mineral product, and salt, tin, mica and diamonds are also mined. Coal, copper, graphite and asbestos are also known to exist. Cattle, goats and sheep are herded over large areas, hides and skins being a valuable export.

Fish are plentiful on the coast in the vicinity of Kilwa, Dar es Salaam and the island of Mafia, pearl oysters being found off the coasts of the latter island.

In 1950, the principal agricultural exports were sisal, coffee, cotton, hides and skins, sunflower seed, beans and pulses including seed, tobacco, cashew nuts, kapok, gum arabic and gum copal, castor seeds and beeswax. The chief imports are cotton piece goods, machinery, iron and steel manufactures, foodstuffs, motor spirit, building materials, apparel, motor vehicles and cigarettes.

Ports.—The principal ports, enumerated from southward, are Mtwara, Lindi, Dar es Salaam and Tanga.

Currency.—Weights and measures.—East African currency is in use, consisting of a silver shilling, the equivalent of 100 cents and

Charts 748b, 2483.

Charts 669, 597.

equalling $\frac{1}{20}$ of one pound sterling; a 50-cent silver piece; copper and bronze 10-cent, 5-cent and one cent pieces; and there are currency notes in denominations ranging from 5 to 1,000 shillings.

The British Imperial Standard weights and measures are in use.

Railways.—The railway systems of Tanganyika, Uganda and Kenya were amalgamated in 1948 under the name of the East African Railways and consist of 3,054 miles of one metre gauge.

The Tanganyika section comprises:—

(1) The main line Dar es Salaam to Kigoma on Lake Tanganyika, 780 miles.

(2) Branch lines: (*a*) Tanga to Arusha, 272 miles,
 (*b*) Tabora to Mwanza on Lake Victoria, 237 miles,
 (*c*) Msagali to Kongwa, 17 miles,
 (*d*) Kaliuwa to Mpanda, 131 miles,
and (*e*) a new line under construction from Mtwara to Lindi, 146 miles.

Chart 664.

ZANZIBAR PROTECTORATE.—General remarks.—The Zanzibar Protectorate consists of the two islands of Zanzibar and Pemba, including the territorial waters thereof and any islets within those waters.

The island of Zanzibar, lying off the coast of Tanganyika in about lat. 6° 00′ S., has an area of about 640 square miles; Pemba, lying about 22 miles north-eastward, has an area of about 380 square miles. Possession of the two islands was first taken by the Portuguese in 1505, but, in 1698, they were taken from the Portuguese by the Imams of Muscat.

Zanzibar was first visited by British war vessels in 1799, and Pemba about 23 years later. In 1856, the African dominions of Muscat became independent under the Sultan of Zanzibar. In 1890, the possessions of the Sultan, which, on the mainland of Africa extended from Uarsceik in about lat. 3° N., to Tunghi bay, in about lat. 10° 42′ S., were ceded to Italy, Great Britain and Germany, respectively, and a British Protectorate was proclaimed over Zanzibar, Pemba, and that part of the coast of Africa ceded to Great Britain. In 1920, the mainland portion of the Protectorate passed under the administration of the Government of Kenya Colony and became the Kenya Protectorate, the two islands then becoming the Zanzibar Protectorate.

The government is administered by a British Resident who is appointed under Her Majesty's Sign Manual and Signet, and exercises his functions under the Zanzibar Orders in Council of 8th December, 1924 and 25th June, 1925. Legislation consists of Decrees enacted by His Highness the Sultan by and with the advice and consent of the Legislative Council, which are binding on all persons when countersigned by the British Resident.

In 1948 the population of the Protectorate was 265,872, of whom about 308 were Europeans; about 15,800 British Indian subjects, through whose hands almost the whole trade of East Africa passes, and 44,560 Arabs, who are the principal landlords and employers of labour. The native population is mostly Swahili, but is very mixed.

The bad reputation which the climate of Zanzibar has obtained, is probably due to the severe and sometimes fatal type of fever, the virulence and effects of which are perhaps somewhat exaggerated, but,

Charts 748b, 2483.

Chart 664.

except in the town of Zanzibar, Europeans should avoid spending the night ashore until acclimatised, especially when in the vicinity of rivers. The worst season for Europeans is from February to May, although the natives appear to suffer more in July and August.

Malarial fever is common, especially inland in Pemba, and Europeans sleeping there by night are almost sure to be attacked by it.

Physical features.—The islands of Zanzibar and Pemba both stand on coral flats; in the former island, the hills attain elevations of about 440 feet (134^{m}1), and undulating ridges with plains between them, extend northward and southward, showing in several instances a coralline surface.

In the island of Pemba, there is no main ridge or line of hills, but all hills are of about the same elevation of about 300 feet (91^{m}4), their ridges radiating out in all directions from a central point, generally in horse-shoe curves.

The soil is extremely fertile, and tropical cereals and edible roots grow in profusion in both islands, although in the island of Zanzibar the soil is sandy in places.

Products.—The clove industry is the most important in the Protectorate, yielding over 80% of the world's supply, three-quarters of the output coming from Pemba; next in importance is the coconut industry. Fishing is carried out by natives, the industry shifting from the northern to the southern coasts and *vice versa*, so as to obtain shelter during the strength of the monsoons.

Owing to its geographical position, the island of Zanzibar may be considered as a storehouse for the whole East African coast and the port of Zanzibar is a large transhipment and distributing centre.

The principal exports, in 1951, were cloves, ivory and coconut oil. The chief imports are rice and grain, cotton piece goods, petroleum and motor spirit, flour, sugar and tobacco.

Ports.—The port of Zanzibar is the only harbour used by ocean-going vessels, but there are several good anchorages.

Currency.—Weights and measures.—East African currency is in use, *see* page 10.

The British Imperial Standard weights and measures are used; a native weight also used is the frasla (frasila) which equals 35 lbs.

Telegraph.—Zanzibar is connected to the general telegraph and telephone systems by submarine cables.

Charts 669, 597.

KENYA COLONY AND PROTECTORATE.—General remarks.—The coast of Kenya Colony and Protectorate extends from the mouth of Mto Yimbo in about lat. 4° 41′ S., to a position about 2 miles south-westward of Ras Chiambone (Dick's head) in lat. 1° 40′ S., and includes the adjacent islands.

Kenya Colony and Protectorate has an area of 224,960 square miles; it is bounded on the south by Tanganyika Territory, on the west by Uganda Protectorate, on the north by Abyssinia and on the north-east by Somalia.

The Protectorate includes certain mainland possessions of the Sultan of Zanzibar, namely a strip of land, 10 miles wide, extending along the coast from the mouth of Mto Yimbo to the northern branch of Mto Tana, the villages of Kau and Kipini, the island of Lamu and all off-

Charts 748b, 2483.

Charts 669, 597.

lying islands between the mouths of Mto Yimbo and Mto Tana, these territories having been leased to Great Britain in 1895.

The Colony and the Protectorate were formerly known as the East Africa Protectorate. In 1905, the Imperial Government, through the Colonial Office, took over the administration of the East Africa Protectorate from the Imperial British East Africa Company, and in 1920, with the exception of the leased territory mentioned above, which was cited at the same time as the Kenya Protectorate, the East Africa Protectorate was annexed to the British Crown under the name of the Kenya Colony.

The whole territory now included under the name of Kenya Colony and Protectorate, is administered by a Governor assisted by an Executive and a Legislative Council, and is divided into four provinces and three extra-provincial districts.

In 1951, the population was estimated at 5,700,000, of whom 42,000 were Europeans, 154,000 Asians and 5,500,000 Africans. On the coast the Arabs and Swahilis predominate, but farther inland are races speaking the Bantu languages and non Bantu tribes such as the Nilotic Kavirondo, the Nandi, the Lumbwa, the Masai, the Somali and the Gallas.

Nairobi, the capital and the seat of the administration, has a population of about 55,000, including about 10,830 Europeans; Mombasa, the capital of the Coast province, has a population of about 84,750, including about 2,027 Europeans.

The climate is not as a rule unhealthy for Europeans, but after a long residence it is likely to be enervating; on the coast, particularly during the south-west monsoon, cool breezes blow constantly, but about 10 or 15 miles inland where the scrub country commences, the heat is untempered by these breezes and is less bearable and malaria is not infrequent. These remarks also apply to the valley of Mto Tana, which, in addition, is rendered almost intolerable at certain seasons by the presence of swarms of mosquitoes.

Physical features.—Within the coast, the land rises in well defined steppes to an elevation of about 800 feet ($243^{m}8$), forming a wide, level plain which contains large areas destitute of water; from this plain rises an intermittent chain of mountains, which extends north-north-westward sometimes in parallel lines, with elevations of from 5,000 to 8,000 feet ($1{,}524^{m}0$ to $2{,}438^{m}4$).

Farther inland are grassy uplands, varied with cultivated ground and forest, the largest plains being those of Kapete, Kapote and Athi, which have about the same elevation as those nearer the coast, but contain the highest ranges in the territory, the Kenya, Sattima and Nandarau ranges reaching respectively, 17,077, 13,214, and about 12,900 feet ($5{,}205^{m}1$, $4{,}027^{m}6$, and about $3{,}931^{m}9$).

Lake Victoria, which lies at an elevation of 3,726 feet ($1{,}135^{m}7$) has an area of about 27,000 square miles; the boundary between Kenya and Tanganyika passes through the centre of the lake. It is about 180 miles in length in an east and west, and about 150 miles in a north and south, direction. Lake Rudolf, in the north-western part of Kenya, has an area of about 3,500 square miles, and there are several smaller lakes, some of which lie at elevations of about 6,000 feet ($1{,}828^{m}8$).

Mto Tana is the principal river; it rises on the western slopes

Charts 748b, 2483.

Charts 669, 597.

of Mount Kenya and its lower part is navigable for shallow draught power vessels for about 200 miles above its mouth. The other rivers are of no navigable importance except Mto Kilifi and Mto Matawapa, both of which are navigable for shallow draught vessels for a few miles within their entrances.

Products.—As the pursuit of agriculture is possible from sea level to altitudes of over 9,000 feet (2,743^{m}2), climatic conditions are extremely varied and tropical, sub-tropical and temperate crops are grown. The main producing areas are in the highlands, where coffee, maize, wheat, wattle, sisal, tea and pyrethrum are crops of major importance; the dairy and wool industries are also important.

At lower altitudes where conditions are tropical, maize, sisal, sugar, coconuts and cotton are important crops.

Dairy and wool industries are important and considerable quantities of hides are exported annually.

The merchantable forest area extends over 1,714 square miles. Pencil cedar is abundant and the export of pencil slats promises to be an important industry as does also the exploitation of the large bamboo forests for paper pulp.

The mineral resources are not yet fully explored, but there is a valuable export of gold; silver, marble, limestone, and sodium carbonate are also mined.

The principal exports are coffee, sisal, tea, gold, cotton and maize; the chief imports are cotton piece goods, machinery, vehicles, fuel oil, wearing apparel, cigarettes and tobacco, and grain and flour.

Ports.—The Port of Mombasa, which comprises Mombasa Old Port and Kilindini harbour, is the principal port, Kilindini being the finest natural harbour on the east coast of Africa. Other small ports, enumerated from southward, are Vanga, Wasin, Kilifi, Malindi and Lamu.

Currency.—Weights and measures.—East African currency is in use, *see* page 10.

The British Imperial Standard weights and measures are used.

Railways.—The Kenya section of the East African Railways comprises:—(*a*) the main line Mombasa to Kampala (Uganda) on Lake Victoria 878 miles and (*b*) numerous branch lines including the Voi-Kahe branch which links up with the Tanganyika section, *see* page 11.

Chart 597.

SOMALIA.—General remarks.—The coast of Somalia extends from a position about 2 miles south-westward of Ras Chiambone (Dick's head) in about lat. 1° 40′ S., to and beyond Capo Guardafui, the north-eastern extreme of Africa. Somalia is bounded on the west by Kenya Colony and Protectorate and on the north-west by Abyssinia and British Somaliland.

As a result of the Treaty of 1915 and the colonial re-arrangements consequent on the First World War, Britain ceded Italy territories on the right bank of the Juba with the port of Chisimaio. Mogadiscio, with a population of 70,000, of whom 3,500 are Italians, is the capital.

During the East African campaign of the Second World War, Somalia was occupied by British and Commonwealth Forces. British Military Administration lasted from 1941 to April 1949, when Somalia passed under the control of the Foreign Office Administration of

Charts 748b, 2483.

Chart 597.

African Territories, until Italy took over the trusteeship on 1st April 1950.

On 2nd December, 1950, the General Assembly of the United Nations approved the trusteeship agreement for the Territory; the 10-year period of Trusteeship Administration fixed by United Nations begins from this date.

The Administrator is assisted by a United Nations Advisory Council composed of the representatives of Colombia, Egypt and the Philippines. Advisory bodies (on economics, education, health, etc.), composed solely or for the greater part of Africans, co-operate with the Administration.

In 1951, the population was estimated at about 1¼ million, of whom 4,449 were Europeans. The inhabitants of the coastal districts mostly consist of a mixture of Arab and Somali blood and in the more important coastal towns, Arabs and Asiatics are also found. The predominant religion is Mohammedan. On the coast, the principal language is Swahili, but Italian is becoming familiar to the majority of the natives.

The climate on the coast is healthy throughout almost the whole stretch from Ras Chiambone to Capo Guardafui, and, except in a few places, there is no malaria.

Physical features.—The northern and central parts of the colony are almost destitute of rivers, these being represented by fissures in the soil which are dry for the greater part of the year. Until fairly recently Wadi Nogàl, which enters the sea at Eil Marina in Baía del Negro, was almost the only river in this part which had a permanent flow of water, but, about 1940, the entrance silted up and the river-mouth was completely closed.

In the southern part of the country, the principal rivers are Fiume Bur Gao, Fiume Giuba and Wadi Scebeli. Fiume Bur Gao is only navigable by shallow draught vessels for a few miles within its mouth, but Fiume Giuba has been ascended for over 400 miles above its entrance and, during the period of high river, an active traffic in local produce is carried by river.

Wadi Scebeli rises in the tableland of Abyssinia and flows in a general south-easterly direction through pastoral and agricultural country. It does not flow into the sea, however, and becomes stagnant in a marshy lake not far from the lower reaches of Fiume Giuba.

Products.—A large amount of the soil is barren but the valleys adjoining Fiume Giuba, Wadi Scebeli and Wadi Nogàl are extensively cultivated and the principal occupations of the natives are agriculture and cattle rearing. The most important industry in the colony is the Hafun salt works, which exports large quantities of salt. Native industries are mat making, pottery and weaving, all carried out by primitive means.

The principal exports are salt, hides, sesame oil, cotton, gum, butter, resin and kapok, and the chief imports, cottons, sugar, rice, tea, coffee, iron, machinery and timber.

Ports.—Baía di Chisimaio and Baía Sud di Hafun (during the north-east monsoon season) are the only anchorages which can be considered as harbours for large vessels; Fiume Bur Gao affords shelter to small coasting craft. The other ports are only open anchorages, and of these the principal ones are Brava, Merca, Mogadiscio, Itala and Obbia.

Charts 748b, 2483.

Chart 597.

Currency.—Weights and measures.—In May, 1950, East African currency was replaced by the "Somalo" (gold parity = 0·124414) issued in coins of 1, 5, 10, 20 and 100 Somali.

The metric system of weights and measures is in use but the following local weights and measures are used by the natives:—

Weights.—One Frasila (Frasla) = 36 Rotoli = 576 Ochie = 16·2 kgr. or 36 lbs.

Lineal measure.—One Top = 7 cubits = 3·92 metres or 13 feet.

Surface measure.—One Darat = 0·8 hectare or about 2 acres.

Measure of capacity.—Dry.—One Gisla = 8 Table = 120 Chele = 163 kgr. or 360 lbs.

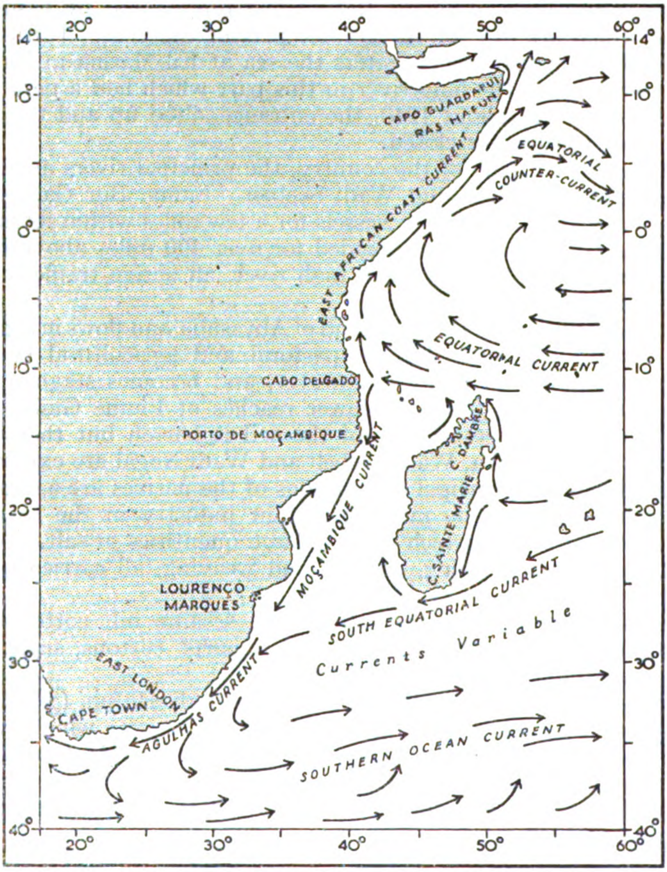
Wet.—One Tanica = 40 Cabe = 18 litres or 4 gallons.

Atlas of Indian Ocean currents.

CURRENTS.—General remarks.—The general surface current circulation of the western part of the Indian Ocean is shown in broad

Charts 596, 597, 748a, 748b, 2483.

Figure 1.



S.W. Monsoon.

Atlas of Indian Ocean currents.

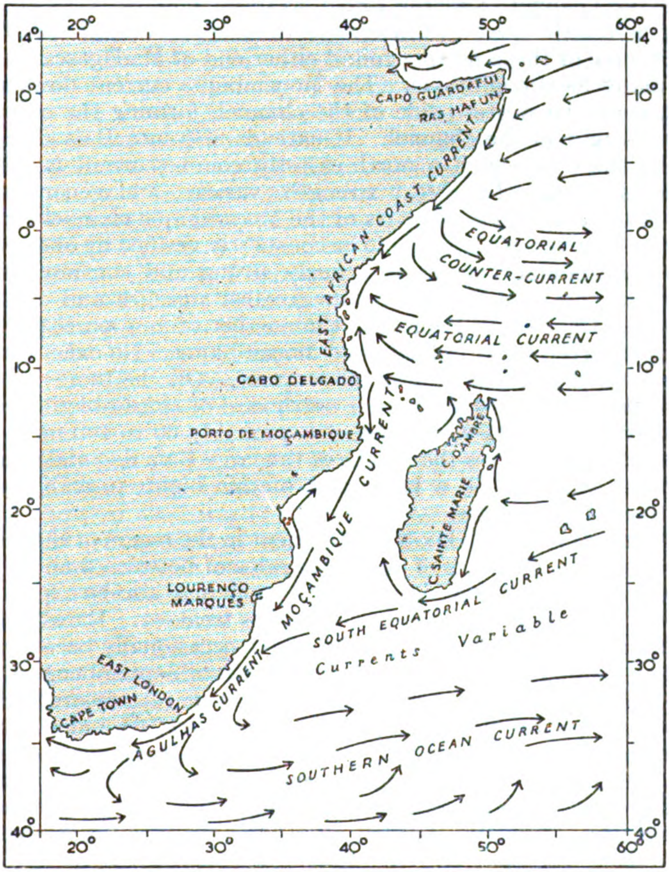
outline in Figures 1 and 2. The west-going Equatorial current, which, in this ocean, lies wholly south of the equator, is impelled by the south-east trade wind. After passing Cap D'Ambre, the northernmost point of Madagascar, it sets towards the African coast in the region of Cabo Delgado and there divides, between the coast and about Longitude 43° E. The latitude of the point of division varies slightly with the monsoons. During the south-west monsoon, it is in Latitude 10°–11° S., and during the north-east monsoon in Latitude 9°–10° S.

The branching of this current produces two coastal currents, that to the north being the East African Coast current, which continues as a north-going flow along the coast to Capo Guardafui during the south-west monsoon period, but only to about Latitude 2° S. during the north-east monsoon period, as explained below.

The other branch forms the Moçambique current, which is a strong south-going current throughout the year. After passing Baía de Lourenço Marques (Delagoa bay) it is known as the Agulhas current for the remainder of its course along the coasts of Natal and Cape of

Charts 596, 597, 748a, 748b, 2483.

Figure 2.



N.E. Monsoon.

Atlas of Indian Ocean currents.

Good Hope province. The Agulhas current is reinforced to some extent by water from the South Equatorial current, which branches off eastward of Madagascar and flows past Cap Sainte Marie, the southern extremity of that island.

Owing to monsoonal influence, the greater part of the East African Coast current, that between Latitudes 2° S. and 10° N., is reversed in direction during the year. From April to October the current is north-going along the whole coast from Cabo Delgado to Capo Guardafui. In December to February it is north-going only as far as about Latitude 2° S; between this point and Latitude 10° N., it is south-going. November and March are months of transition between one direction and the other.

In December to February the south-going East African Coast current turns eastward in the region of the equator and passes into the east-going Equatorial countercurrent, which flows across the ocean. The Equatorial countercurrent is more fully described in the South Indian Ocean Pilot.

The main currents are described in fuller detail below. Currents prevailing off various ports are referred to in the appropriate places in the body of the work.

Moçambique channel.—*Caution.*—The island of Madagascar screens the channel from the direct westerly flow of the Equatorial current across the ocean. Currents in the channel are affected by the varying force of those flowing round either end of Madagascar, as well as by many local conditions. The Moçambique current flows south-westward on the western side of the channel, forming the only well-defined current in the channel. It extends also into Baía de Sofala, near the shore of which a north-easterly countercurrent is however sometimes found. The great strength, variety, and general uncertainty of the currents in all parts of the Moçambique channel render it necessary for a vessel's position to be constantly verified by observation.

The Moçambique current is a fairly strong and constant current throughout the year, but attains its greatest strength and constancy from about October to February, the northern monsoon season, particularly between Cabo Delgado and Moçambique. No exact estimate can be formed of the width of this current. Off the more unbroken parts of the coastline, such as that northward of Moçambique and also northward of Cabo das Correntes, it is probably 60 to 100 miles wide. The current flows across the mouth of the large Baía de Sofala but also extends in width to fill a large part of this bight, probably to the 100-fathom (182^{m}9) line.

Rates of from one to 2 knots are frequent in the region of the Moçambique current at all times of year, and rates of between 2 and 3 knots are not uncommon. Rates exceeding 3 knots may also be experienced, except in May to July, when the current is weakest. Rates of about 4 knots, from 90 to 107 miles per day, have occasionally been recorded during the period 1910 to 1934, in the months of September to December inclusive. On the other hand, the greatest rate recorded during this period, in the months of May to July, was 64 miles per day.

The predominant directions of set within the course of the Moçambique current are from south to south-west inclusive, but sets in westerly, west-south-westerly, and south-south-easterly directions are also relatively frequent. Sets in all other directions, including those

Atlas of Indian Ocean currents.

between north and north-east, in direct opposition to the normal flow of the current, may be experienced at times, either in the usual region of the Moçambique current, or immediately seaward of it. These variable and reverse sets may attain or exceed the rate of one knot.

Near the coast of Baía de Sofala, beginning almost as far southward as Cabo das Correntes, and extending northward beyond Rio dos Bons Sinais there is often a countercurrent setting north-eastward and extending a considerable distance off-shore, especially off Sofala and during the strength of the southern monsoon. There is little exact information about the frequency and rate of this countercurrent, which is probably weak and intermittent; a rate of 35 miles a day has, however, been recorded in May. The prevailing wind appears to have a marked effect on the set of current within a few miles of the coast. Currents setting more or less directly on shore have been recorded in the neighbourhood of Beira and elsewhere in the bight; these may attain or exceed the rate of one knot at times.

Observations of current off the western coast of Madagascar are scanty. Part of the Equatorial current flowing past Cap Sainte-Marie turns northward along the south-western coast of Madagascar, but gradually weakens, and there is no evidence of a general northward current up the western coast of the island. The current is usually of no great strength; its direction appears to follow that of the wind, being sometimes northerly and sometimes southerly. Southerly currents up to a rate of 1½ knots have been experienced. Off the western coast of the peninsula, of which Cap D'Ambre is the northern extremity, the combined current and tidal streams normally set northward at rates up to 2½ knots. This passes into the main part of the Equatorial current setting westward past Cap D'Ambre.

The Equatorial current sets westward at an average rate of about 1½ knots between St. Lazarus bank and Iles Comores; a little north-westward of this group, in December, it has been found setting nearly due west at a rate of from 2 to 3 knots. Iles Comores lie on the southern boundary of the Equatorial current, which flows past Ile Grande Comore (Comoro). The boundary being in about Latitude 12° S., this westerly current is found northward of Ile Anjouan. In the vicinity of Ile Mayotte (Mayotta) the current is very variable. Between Ile Mayotte and Ile Anjouan, the current generally sets south-westward, but at times south-eastward with considerable strength. About the southern end of Ile Mayotte an east-going current is common. Currents in some easterly directions appear to predominate throughout most of the year southward of Iles Comores to about Latitude 14° S., particularly south-eastward of Ile Mayotte, between Longitude. 45° E. and the north-western coast of Madagascar. This easterly current turns north-eastward as it approaches this coast, and finally passes into, or forms a seaward extension of the northerly current off the western coast of the Cap D'Ambre peninsula, referred to above.

Southward, from about Latitude 14° S. until past the narrow part of the Moçambique channel, no dependence can be placed on the direction or rate of the current; it may run 3 knots one way and at times as much another.

In the remaining part of the Moçambique channel, southward of Latitude 18° S. and eastward of the Moçambique current, the currents experienced are variable and may set in any direction, the majority

Atlas of Indian Ocean currents.

at rates up to one knot, but occasionally attaining or exceeding 2 knots. Currents with a northerly component predominate, however, in certain parts of the channel. A northerly set is thus often experienced immediately eastward of the Moçambique current. In the southern part of the channel, the sea temperature may indicate the presence of this countercurrent; if below 68° it may be concluded that the vessel is certainly eastward of the south-going Moçambique current.

In the middle of the channel, between Latitudes 20° and 22° S., Longitudes 38° to 42° E., the predominant current is from north to north-east throughout the year, the wind being generally southerly. Between May and August, the strength of the southern monsoon, a current apparently sets north-westward from the southern extremity of Madagascar past Ile Europa, as far westward as Longitude 40° E., and then turns northward, but it should not be depended on. Near this island, in November, the current has been found setting north-westward at a rate of from 2 to 2½ knots, causing strong tide-rips, but neither the rate nor direction of these currents may be the same for two consecutive days.

Agulhas Current, Delagoa bay to Longitude 28° E.—This part of the Agulhas current is stronger and more constant than that westward of Longitude 28° E. The directions of currents mainly experienced are, in order of frequency, south-westward, south-south-westward and southward, but occasional currents are met from any point of the compass. The axis of strongest current is on or near the 100-fathom (182^{m}9) line.

The current is strongest during February to April, when about 16 per cent of all currents observed exceed the rate of 3 knots. The corresponding proportions for the remainder of the year are, May to October 9 per cent, November to January, 13 per cent. The strongest currents observed are from 4 to 5 knots; most of these are recorded between about Latitudes 31½° S. and 33½° S., at all times of the year, but least frequently in May to July. This short section of the current is therefore the strongest part of the whole course of the Agulhas current.

As with all other great coastal currents of the world, it is not possible to define a seaward limit, since the preponderance of sets in or near the main direction of the current decreases gradually seaward. The following remarks give information regarding the strength of the current at various distances from the coast.

Observations made by H.M.S. *Lowestoft* in 1923, indicated that the main body of the Agulhas current was outside the edge of the 100-fathom (182^{m}9) bank, and that outside this edge, a 4-knot current was experienced. Inside the edge of the 100-fathom (182^{m}9) bank, the current decreased gradually on approaching the coast. The strength of the current varied considerably with the wind.

On July 18th, 1926, H.M. Ships *Birmingham*, *Lowestoft*, and *Verbena* working in company, investigated the strength of the Agulhas current at different distances from the coast. At 1000, H.M.S. *Birmingham* was in Latitude 32° 13′·5 S., Longitude 29° 23′·8 E., with H.M.S. *Verbena* 5 miles on her starboard beam and H.M.S. *Lowestoft* 5 miles on her port beam. Each ship maintained revolutions for 10 knots, on a course approximating to the set of the current. Over a period of

Charts 596, 597, 748a, 748b, 2483.

Atlas of Indian Ocean currents.

6 hours, H.M.S. *Verbena,* whose course took her from one to 2 miles outside the edge of the 100-fathom ($182^{m}9$) bank, and 12 miles offshore, averaged 0·62 knots faster than H.M.S. *Birmingham,* and 1·27 knots faster than H.M.S. *Lowestoft.*

The following information refers to the Agulhas current between Durban and Latitude 34° S. in the months of February to April, and gives the result of plotting the mid-positions of 71 observations of current made during the period 1910 to 1930.

Five drifts of 100 miles per day or more were all observed between Latitudes 31° and 33° S., within 12 to 16 miles from the coast; the two greatest were at the rate of 120 miles per day. Four out of six drifts of between 90 and 100 miles per day, were either on the edge of the 100-fathom ($182^{m}9$) bank or a few miles outside it; one was experienced about 32 miles from the coast. A drift of 96 miles per day was observed about 3 miles from the coast, northward of the entrance to the St. John's river, while two of 80 miles per day and one of 58 miles per day, were recorded still nearer the coast.

The majority of the weaker drifts, less than 2 knots, observed within 30 miles of the coast, were within the edge of the 100-fathom ($182^{m}9$) bank. Beyond 30 miles from the coast, 17 observations were available, indicating south-westerly sets of one knot or more up to a distance of 90 miles, while one of a quarter of a knot was recorded at 150 miles from the coast.

Inshore countercurrents between Porto de Moçambique and East London.—Between the main current and the coast, countercurrents flowing in a north-easterly direction and following the trend of the coast, are experienced at times, especially in certain localities. References to these countercurrents will be found in the descriptions of the following ports and localities:—Entrance to the Great Fish river, East London, Cape Morgan to Bashee point, Port St. John's, Durban and the Aliwal shoal, Port Durnford, Durnford point to O'Neill peak, Ponta Závora to Ponta da Barra, Ponta da Barra Falsa to Cabo São Sebastião and Porto de Moçambique. In general, these countercurrents are probably weak, though in places they have been observed to reach one or 1½ knots, and they are influenced by the wind prevailing at the time.

In 1923, H.M.S. *Lowestoft* experienced a northerly set, with westerly winds, when within 3 miles of the coast from Port Shepstone to Cape Natal, and also on the Tugela bank.

Countercurrents are also met with in Baía de Sofala, *see* Moçambique channel, on page 19.

Agulhas Current westward of Longitude 28° E.—In the vicinity of Longitude 24° E. the Agulhas current spreads out and weakens, the main part of it continues over the Agulhas bank past Cape Agulhas and, entering the South Atlantic ocean, passes into the Benguela current of that ocean. The warm water of the Agulhas current usually fills False bay, but during long north-westerly gales it is occasionally driven out and replaced by cooler water from the Atlantic ocean setting eastward. Agulhas current water seldom reaches Table bay, the water of which is normally much colder than that in False bay.

Another part of the Agulhas current sets south-westward, following the south-eastern edge of the Agulhas bank and this recurves, turning

Atlas of Indian Ocean currents.

southward and south-eastward into the northern part of the east-going Southern Ocean current, in about Latitude 38° S. As shown in Figure 1, a similar recurvature takes place from the seaward edge of the Agulhas current further north. The region of recurvature therefore extends from about Latitude 32° S. to the south-eastern side of the Agulhas bank. This recurvature is not very constant being subject to considerable variation; it is weakest in May to July when the flow of the Agulhas current is weakest.

Not all the water flowing down the south-eastern side of the Agulhas bank recurves; some of it passes over the southern part of the bank or round its southern edge.

The current set is very variable in this region; while the predominant directions are between west-north-westward and south-south-westward, currents in any other direction may be met. The majority of currents do not exceed the rate of 2 knots, but occasional currents in the predominant directions are stronger and may reach or exceed 3 knots, throughout the year. A current of about 4 knots was observed in July, 1914, in Latitude 36° 04′ S., Longitude 22° 55′ E.

Inshore countercurrent.—Near the coast, between Cape Hangklip and Cape Agulhas, the current occasionally sets in an east-south-easterly direction, or dangerously towards the land, with sometimes, a rate exceeding one knot; in this locality, many vessels have been lost through not allowing for this possible set by keeping a sufficient offing.

Between Cape Agulhas and the entrance to the Kowie river, in about Longitude 27° E., an inshore current setting eastward at about the same rate is also frequently experienced in fine weather, and, except off the mouths of the rivers, it follows the trend of the coast, extending probably from one mile to 6 miles offshore. Off the coast between the entrance to the Kowie river and East London, from observations made during the period April to July, 1938, the countercurrent was found to be generally weak, and extended only a short distance from this part of the coast. Proceeding from East London to Cape Agulhas during strong westerly winds, no current was experienced by H.M.S. *Lowestoft* in 1923, at about 7 miles from the coast. *See* caution below.

All reports agree that eastward of Cape Agulhas there is often an indraught, which seems to be strongest between January and April, both months inclusive, and a large proportion of the wrecks which have occurred between Cape Agulhas and Cape Infanta have been attributed to it.

Caution.—Although the southern edge of the Agulhas current has a tendency to set from the land, the northern or inner edge has a tendency to set towards it. This is especially apparent westward of Algoa bay, where during and after south-easterly, westerly or north-westerly gales, the current is at times deflected from its normal course and turned directly towards the land. This deflection forms a very dangerous element in the navigation of the southern coast of Africa.

Southern Ocean current.—The current which flows southward of the Cape of Good Hope, from the South Atlantic ocean across the South Indian ocean, forms part of the Southern Ocean current, which sets generally eastward round the globe. It is produced by the pre-

Charts 596, 597, 748a, 748b, 2483.

Atlas of Indian Ocean currents.

dominating westerly winds of the Roaring Forties, and its southern limit lies on the average in about Latitude 66° in the longitudes of the South Indian ocean.

The Southern Ocean current, in the longitudes of the South Indian ocean, is not a well-defined or constant current. It is a region of variable current with some predominance of sets having an easterly component. The variability is greater eastward of Longitude 80° E. than in the western half of the ocean. The most constant easterly flow is found between Latitudes 38° S. and 42° S., Longitudes 20° E. to 60° E., in August to April, and between Latitudes 40° S. and 42° S. and the same longitudes in May to July. In this region a moderate proportion of currents, with rates of between one and 2 knots will be met ; rates exceeding 2 knots are, however, rare. Elsewhere the proportion of currents exceeding one knot is smaller, and rates exceeding 2 knots have not been recorded.

The mean resultant set, the direction of the drift of water in the long run, is eastward, between Longitudes 20° E. and 40° E., north-easterly between Longitudes 40° E. and 80° E., and between east and south-eastward of Longitude 80° E. The predominant flow of current will, therefore, tend towards these directions.

The current has no defined northern boundary ; the predominance of easterly sets decreases with decreasing latitude in the central longitudes of the ocean until it merges into the region of variable current southward of the Equatorial current. Some predominance of easterly sets is found as far north as Latitude 28° S. or 30° S. in the central longitudes of the ocean.

Equatorial current in the vicinity of Madagascar.—The Equatorial current as a whole is described in the South Indian Ocean Pilot and only its western portion is referred to here.

A large part of the Equatorial current flows westward past Cap D'Ambre towards the African coast. Westward of Longitude 65° E. or 70° E., the current strengthens considerably during May to October, the period of the south-west monsoon. Between Latitude 8° S. and the latitude of Cap D'Ambre, Longitude 44° E. to 52° E., more than half the currents experienced during this season have rates exceeding one knot, and rates exceeding 2 knots are not uncommon. Occasional currents with rates exceeding 3 knots also occur. The predominating directions are north-west to south-south-west, inclusive. The Equatorial current, westward of about Longitude 60° E., widens, so that its northern limit is in about Latitude 4° S. It thus passes over the Seychelles bank from June to September, inclusive. Westward of Longitude 52° E., and therefore immediately westward of the region where water recurves north-eastward from the Equatorial current into the counter-current, westerly and north-westerly sets are found as far northward as Latitude 2° S., or even to the equator, as the Equatorial current flows into the East African Coast current.

During the north-east monsoon period, November to January, the current past Cap D'Ambre strengthens slightly, as compared with that in the open ocean, and occasional sets exceeding 2 knots are experienced. The northward limit of the current northward of Cap D'Ambre is in about Latitude 6° S. In February to April there is no such strengthening, and the width of the current northward of Cap D'Ambre is further reduced, the northward limit being in about Latitude 8° S.

Charts 596, 597, 748a, 748b, 2483.

Atlas of Indian Ocean currents. Northward of this, the north-easterly sets of the recurvature into the counter-current are found.

In the region of general westerly flow from southward of Cap Sainte-Marie towards the African coast, a high degree of variability of current is to be expected, with at times almost or quite as many easterly sets as westerly ones. A considerable proportion of currents exceeds the rate of one knot, irrespective of direction; none exceeding 2 knots has been recorded. Offshoots from this, flow northward into the Moçambique channel.

East African Coast current.—The periods in which this current sets in alternate directions do not entirely correspond to the periods of the two monsoons. The north-going flow covers the whole of the south-west monsoon period but begins before the south-west monsoon wind is established in this region about the beginning of May. March is the transition month for the change of current direction; in this month the current runs northward from Latitude 5° N.; in April the whole of the current runs northward. These periods are averages and may be subject to some variation from year to year, as the time of the change of the monsoons is not always the same.

The reason for the current changing direction from one to two months before the change of wind is explained in the West Coast of India Pilot. During the latter part of the north-east monsoon period a gradient current, due to sea temperature difference, flows in the coastal regions of the Arabian sea, and along the African coast southward of Capo Guardafui, reversing the coastal current to the direction which it will subsequently retain as a current caused by the south-west monsoon.

April to October.—During these months the current sets northward, following the trend of the coast, from Cabo Delgado to Capo Guardafui, *see* Figure 1, and water branches eastward from the seaward side of this current, northward of the equator. The main body of the East African Coast current turns eastward away from the coast in about Latitude 7° to 10° N., and subsequently south-eastward, into the general easterly monsoon drift of the North Indian Ocean; the more southerly part enters the Equatorial countercurrent. The part continuing past Capo Guardafui and water branching from this and passing eastward of Socotra, enter the Arabian Sea.

The East African Coast current during these months is strong and relatively constant, but directions other than those between north and east occur at times. Between Cabo Delgado and Mombasa a considerable proportion of the currents experienced on the shipping tracks exceed the rate of 2 knots, with occasional ones exceeding 3 knots, chiefly in May to July. The current runs past the islands and channels of Mafia, Zanzibar and Pemba at a rate of from 2 to 4 knots.

Between Mombasa and Latitude 6° N., the sets are mainly between north and north-east. A large proportion of the currents exceed the rate of 3 knots in May to July, and occasional ones may attain or exceed 4½ knots. The strongest current that has been reported in this region is one of 5½ knots in May, 1915, between Uarsciech and Ras Assuad. In August to October, while many currents are met with rates of from 2 to 3 knots, the number exceeding 3 knots is considerably smaller than in May to July. Some sets in other directions occur in April to October, chiefly between west and south.

Atlas of Indian Ocean currents.

Between Latitude 6° N. and Capo Guardafui stronger currents are observed in August to October than in May to July, in which period the rate of 3 knots is seldom exceeded.

The East African Coast current, as it branches eastward into the ocean southward of Socotra, is very strong in July to September, during the height of the south-west monsoon. In these months the area of strongest current is between Latitudes 7½° and 10½° N. and Longitudes 51½° and 54½° E.; the largest number occurs between Latitudes 8½° and 9½° N.

Many currents with rates between 4 and 5½ knots have been reported, with occasional observations of 6 knots and over, the maximum being one of exactly 7 knots. The rates of 6 knots and over are greater than those known in any other oceanic region. When the current is setting strongly east-south-eastward or south-eastward, it is athwart the wind, and there is often a very heavy confused sea over a considerable area in this locality. In making the coast of Africa from eastward care should be taken to avoid the strength of the current by keeping well southward.

In addition to these very strong currents which set between north-eastward and south-eastward, currents in all other directions may be experienced in April to October, but these do not usually much exceed one knot. In August to October, however, currents setting between north and west-north-westward may attain rates of 2½ to 3 knots.

The remarks made above about the difficulty of assigning a definite width to the Agulhas current apply also to the East African Coast current, especially northward of the equator, where it branches eastward. The following remarks give information regarding the strength of the current at various distances from the coast in equatorial latitudes; they are the result of plotting the mid-positions of 46 observations of current made between Latitudes 2° S. and 2° N. and between the coast and Longitude 48° E., in May–July, during the period 1910–1930. The strongest currents were observed between 30 and 40 miles from the coast. Most of the rates exceeded 2½ knots up to 60 miles from the coast and did not reach 2½ knots between 60 and 120 miles from the coast. One of over 3½ knots was, however, recorded 130 miles from the coast. Beyond 100 miles from the coast, sets in other directions were mainly observed.

Eastward of the island of Mafia, in about Latitude 8° S., the current is found sometimes to extend only about 30 miles offshore, but at other times much more, rendering it difficult to estimate its effect when approaching the coast from seaward.

November.—This is a transition month for current direction, and the currents are more variable. The predominant directions are southerly or onshore.

December to February.—As previously stated, the East African Coast current flows southward from about Latitude 10° N. during these months, *see* Figure 2. Northward of Latitude 10° N., past Ras Hafun to Capo Guardafui, the current is northerly throughout the year. The only change on this stretch of coast is that during the south-west monsoon period the predominant direction is north-easterly, i.e. away from the coast, while during the north-east monsoon period it is north-westerly, towards the coast. During the south-west

Atlas of Indian Ocean currents.

monsoon, however, the current close inshore off Capo Guardafui rounds that cape to the westward, *see* Red Sea and Gulf of Aden Pilot.

South of about Latitude 10° N., the current sets southward following the trend of the coast, the most frequent directions being from west-south-west to south-south-west. The maximum rates of current, between Latitudes 6° N. and 2° S., may reach or exceed 3 knots, with occasional ones at 3½ to 4 knots. The strongest and most constant section of the current is between Latitudes 6° N. and 2° N., where about one current in eight may be expected to exceed 2 knots. Even in this part of the current, a number of sets in other directions are met, mainly north-westerly and south-easterly.

The meeting of the northerly and southerly sets takes place between the island of Lamu and Isolotto Famauali (Punta Castello), in from Latitude 1½° S. to 2½° S., the opposing sets producing an offset from the coast. The exact place of meeting probably varies with the monsoon, extending a little southward when this is particularly strong. During February, 1891, a southerly current was experienced by several vessels considerably southward of Lamu, the north-east monsoon being then unusually strong. Off Malindi (*Lat. 3° 15′ S*), the southerly current may be found running within the 100-fathom ($182^{m}9$) bank, while the northerly current is flowing outside this edge, *see* page 450.

The northerly current flowing along the coast from the region of Cabo Delgado to the meeting point with the southerly current sets between north-north-east and west-north-west, north being the most frequent direction. A small proportion of currents exceed the rate of 2 knots and a few may exceed 3 knots, northward of Latitude 4° S. Occasional currents set in other directions, chiefly between west and south.

Southward of about Latitude 2° N., water branches from the seaward side of the southerly current to pass into the east-going Equatorial countercurrent. At the southern extremity of the southerly current, where it meets the northerly current, the water is similarly diverted so that south-easterly sets may be found seaward of the northerly coastal current, between about Latitudes 2° S. and 4° S.

March.—This is a transition month for current direction, and the currents are more variable. The predominant direction is still southerly, south of about Latitude 5° N., but northward of this it is northerly.

Effect of a tropical revolving storm on the current.—In the vicinity of a tropical revolving storm the set and drift of current may be markedly different from that normally to be expected. Comparatively little is known about such currents, particularly near the centre of the storm, since navigators avoid the centre whenever possible and conditions within the storm field generally are unfavourable to the accurate observation of current.

The primary cause of the currents is the strong wind associated with the storm; the strength of current produced by a given force of wind varies with latitude and is greatest in low latitudes. For the latitudes of tropical storms, say 15° to 25°, a wind of force 10 would produce a current of about one knot. It is believed that the strength of the currents of tropical storms is, on the average, the same as that which wind of similar force, unconnected with a tropical revolving storm, would produce. These currents, at the surface of the

Atlas of Indian Ocean currents.

water, set at 45° to the right of the wind direction (in the northern hemisphere) and therefore flow obliquely outward from the storm field, though not radially from the centre.

Unless due allowance is made for these sets, very serious errors in reckoning may therefore arise. It is reported that, in one case, a vessel experienced a south-easterly set of more than 50 miles, under conditions when the set normally to be expected was south-westerly. In another case, an unexpected south-south-westerly set of 60 miles was experienced in 18 hours. These are examples of currents of abnormal strength, which are occasionally met in the vicinity of tropical revolving storms, and which cannot be accounted for by the wind strength. The possibility of such an experience should be borne in mind, particularly near, say within 100 miles of, the centre of the storm.

Other currents, not caused directly by the wind, may flow in connection with these storms but are probably weak and therefore negligible in comparison with the wind current.

The above remarks apply to the open ocean. When a tropical storm approaches or crosses an extended coastline, such as that of Florida, a strong gradient current parallel to the coast will be produced by the piling up of water against the coast; the sea-level may rise as much as from 8 to 15 feet on such an occasion.

Whether the storm is in the open ocean or not, there is a rise of sea-level inwards to its centre which compensates for the reduction of atmospheric pressure. The extent of this rise is never great, from one to 2 feet ($0^{m}3$ to $0^{m}6$) according to the intensity of the storm. It produces no current so long as the storm is not changing in intensity. If the storm meets the coast, however, the accumulation of water at its centre will enhance the rise of sea-level at the coast, as mentioned above, and so produce a stronger gradient current along the coast.

TIDAL STREAMS.—In the whole of the area covered by this Pilot the tidal streams are weak except very close inshore. As the currents are comparatively strong and also subject to considerable variations with change of wind, etc., the effect of the tidal streams on the resultant water flow is negligible at more than a few miles offshore, except perhaps opposite the mouths of the larger rivers.

Close inshore in the vicinity of bay or river entrances, the effect of the tidal stream becomes increasingly important as these features are approached. Across the entrance bars of some of the rivers, streams of as much as 5 knots are experienced. In general, the river current causes the rate and duration of the out-going stream considerably to exceed those of the in-going one, especially during the rainy season.

Details of the inshore currents and of the tidal streams will be found in the text for places for which information is available.

Chart 1241.

Ice.—Between Longitudes 20° W. and 40° E., icebergs are rarely met with north of about Latitude 39° S. Throughout the year, between Longitudes 10° E. and 40° E. the extreme limit of bergs fluctuates only between Latitudes 39° and 41° S. Between Longitudes 20° W. and 10° E., the limit varies more in latitude during the year and in any given season does not run parallel with the circles of latitude. The most northerly position of the limit is in about Latitude 38½° S.,

Charts 596, 597, 748a, 748b, 2483.

Chart 1241.

between Longitudes 0° and 10° E., in August and September; the most southerly is in about Latitude 48° S., between Longitudes 0° and 10° W. in May and June.

By the extreme limit is meant the line beyond which icebergs have only been reported on rare occasions. Small pieces of ice, the residue of bergs, may be met with in positions northward of this limit, but observations of such ice in these exceptional positions have been very rare since 1885.

The mean limit of icebergs between Longitudes 20° W. and 40° E. lies furthest north in October to December, when it is between Latitudes 43° and 46° S. It is, in general, furthest south in February to June, particularly between Longitudes 10° W. and 10° E. where it lies between Latitudes 53° and 55° S.

The extreme limit of pack-ice between Longitudes 20° W. and 40° E., attains its most northerly Latitude in August to December, when it lies mainly between 53° and 55° S.

SIGNALS.—Vessels inconvenienced by searchlights.—In the event of the navigation of a vessel being inconvenienced by the glare from searchlights near a port in the British Empire, she should make the International Code signal ZO (— — • • — — —) by lamp and by whistle, siren or fog horn.

Both the light and sound signals should be employed, whenever possible, and should be repeated until the inconvenience is removed. Only real urgency should necessitate the use of this signal, as unless the vessel is actually in the rays of a searchlight, it is not possible for the operators to know which projector is affected.

This signal is designed to assist mariners; no liability whatever will be admitted.

This signal should also be used in similar circumstances near ports in other countries.

Lloyd's reports.—Reports can be transmitted through Lloyd's by the signal stations at Cape point (Cape of Good Hope) and Cape Agulhas. *See* pages 94 and 106.

Immigration flag.—A yellow flag having a black ball in its centre has been adopted as the Immigration flag at all ports in the province of Cape of Good Hope. This flag, hoisted at the stay by a vessel arriving in port, denotes that the examination of passengers by the Immigration Officer is being carried out, and that no person, unless provided with a permit or authorised by the Immigration Office, is, under penalty, allowed on board that vessel.

Signals to be displayed by vessels carrying explosives or inflammable liquids.—*See* page 37.

LIFE-SAVING.—Lifeboats and life-saving appliances form the principal means adopted for saving life; the stations where these are maintained are listed hereafter and are mentioned in their appropriate places in this Volume.

The line-throwing apparatus, the principal life-saving appliance, can often be used with effect when a lifeboat is not available; its success, however, depends largely upon an intelligent co-operation on the part of the crew of the stranded vessel.

Signals.—In accordance with the International Convention for the

Charts 2202a, 748a, 2203, 2127, 2483.

Safety of Life at Sea, 1948, Chapter V, Regulation 16, the following signals shall be used by life-saving stations when communicating with ships in distress and by ships in distress when communicating with life-saving stations :—

(*a*) *Replies from shore station to distress signals made by a ship* :—

Signal.	*Signification.*
By day.—*White* smoke signal. *By night.*—*White* star rocket.	" You are seen—assistance will be given as soon as possible."

(*b*) *Landing signals for the guidance of small boats bringing away the crew of a wrecked ship* :—

Signal.	*Signification.*
(i) *By day.*—Vertical motion of a white flag or the arms. *By night.*—Vertical motion of a *white* light or flare. A range (indication of direction) may be given by placing a steady *white* light or flare lower and in line with the observer.	" This is the best place to land."
(ii) *By day.*—Horizontal motion of a white flag or arms extended horizontally. *By night.*—Horizontal motion of a *white* light or flare.	" Landing here highly dangerous."
(iii) *By day.*—Horizontal motion of a white flag, followed by the placing of the white flag in the ground and the carrying of another white flag in the direction to be indicated. *By night.*—Horizontal motion of a *white* light or flare, followed by the placing of the *white* light or flare on the ground and the carrying of another *white* light or flare in the direction to be indicated.	" Landing here highly dangerous. A more favourable location to land is in the direction indicated."

(*c*) *Signals to be employed in connection with the use of shore life-saving apparatus* :—

Signal.	*Signification.*
(i) *By day.*—Vertical motion of a white flag or the arms. *By night.*—Vertical motion of a *white* light or flare.	*In general* :—" Affirmative." *Specifically* :— " Rocket line is held." " Tail block is made fast." " Hawser is made fast." " Man is in the breeches buoy." " Haul away."
(ii) *By day.*—Horizontal motion of a white flag or arms extended horizontally. *By night.*—Horizontal motion of a *white* light or flare.	*In general* :—" Negative." *Specifically* :— " Slack away." " Avast hauling."

A line-throwing apparatus is maintained at the following places:—Cape Town (2), Robben island, Slangkop point, Cape point, Simonstown, Cape Agulhas, Cape St. Blaize, Knysna harbour entrance, Port Elizabeth, East London (2), Port Shepstone and Durban (2).

LOCAL MAGNETIC ANOMALIES.—Local Magnetic Anomalies have been reported near Slangkop point (page 92), off the Cape peninsula (page 82) and in Baía de Lourenço Marques (page 202).

AIR LIGHTS.—Mariners are warned that lights (with definite characteristics), which are not ordinary navigational aids, may be exhibited for the use of aircraft from structures near the coasts described in this volume.

These lights are often of great luminous power and elevation and may be the first lights or looms of lights sighted when making a landfall at night; they normally have the following characteristics:—

(*a*) *Flashing white* (revolving beam type).
(These lights are usually screened from seaward but their looms may be visible).

or (*b*) *Alternating flashing white and green* (revolving beam type).

or (*c*) *Flashing two letter groups* in the Morse Code, in *red* or *green*.
(Although the groups made by these lights may have definite meanings in the International Code of Signals, their signification is to be disregarded; the fact that they are *red* or *green* in colour, and flash with mechanical regularity, should prevent their being mistaken for signals from shore signal stations or ships).

Air lights which appear likely to be visible from seaward will be shown on charts and described in the Admiralty List of Lights. As they are subject to changes of which prompt notification to the mariner may not always be possible, care should be taken that they are not confused with marine navigational aids.

SUBMARINE CABLES.—The following articles are taken from the International Convention for the Protection of Submarine Telegraph Cables of 14th March, 1884.

ii. It is a punishable offence to break or injure a submarine cable, wilfully or by culpable negligence, in such manner as might interrupt or obstruct telegraphic communication, either wholly or partially, such punishment being without prejudice to any civil action for damages.

This provision does not apply to cases where those who break or injure a cable do so with the lawful object of saving their lives or their ship, after they have taken every necessary precaution to avoid so breaking or injuring the cable.

v. Vessels engaged in laying or repairing submarine cables shall conform to the regulations as to signals which have been, or may be, adopted by mutual agreement among the High Contracting Parties, with the view of preventing collisions at sea.

When a ship engaged in repairing a cable exhibits the said signals, other vessels which see them, or are able to see them, shall withdraw to or keep beyond a distance of one nautical mile at least from the ship in question, so as not to interfere with her operations.

Fishing gear and nets shall be kept at the same distance.

Nevertheless, fishing vessels which see, or are able to see, a telegraph-ship exhibiting the said signals, shall be allowed a period of twenty-four hours at most within which to obey the notice so given, during which time they shall not be interfered with in any way.

The operations of the telegraph-ships shall be completed as quickly as possible.

vi. Vessels which see, or are able to see, the buoys showing the position of a cable when the latter is being laid, is out of order, or is broken, shall keep beyond a distance of one quarter of a nautical mile at least from the said buoys.

Fishing nets and gear shall be kept at the same distance.

vii. Owners of ships or vessels who can prove that they have sacrificed an anchor, a net, or other fishing gear in order to avoid injuring a submarine cable, shall receive compensation from the owner of the cable.

In order to establish a claim to such compensation, a statement supported by the evidence of the crew, should, whenever possible, be drawn up immediately after the occurrence; and the master must, within twenty-four hours after his return to or next putting into port, make a declaration to the proper authorities.

The latter shall communicate the information to the Consular authorities of the country to which the owner of the cable belongs.

Caution.—Cautionary notes appear on many charts calling attention to areas in which there are submarine telegraph cables. These areas are indicated on the charts by pecked lines.

Every care should be taken to avoid anchoring in such areas, even though there may be no specific prohibition against doing so, in view of the serious interference with communications which results from damage to submarine cables.

Equal care should be taken wherever the symbol for a submarine cable (a wavy line) is shown on the chart.

Danger involved in cutting a submarine cable to clear anchors or fishing gear.—In the event of any vessel fouling a submarine cable in these areas, every effort should be made to clear the anchor or gear by normal methods; should these efforts fail, the anchor or gear should be slipped and abandoned *without attempting to cut the cable. High voltages are, or may be, fed into certain submarine cables; serious risk exists of loss of life due to electric shock, or at least of severe burns, if any attempt to cut the cable is made.* No claim in respect of injury or damage sustained through such interference with a submarine cable will be entertained.

Compensation for anchors or fishing gear sacrificed in order to avoid injuring a submarine cable can be claimed under the Submarine Telegraph Act of 1885 (Schedule of Submarine Telegraph Convention, Article VII).

BUOYAGE.—General description of "Lateral" and "Cardinal" Systems.—There are two uniform systems of buoyage in use, the "Lateral" system and the "Cardinal" system. They may be used simultaneously and, if so used, the transition from one system to the other is indicated by a mark painted red and white or black and white in diagonal stripes, with topmark consisting of a cross and two horizontal bars, painted red or black. In cases where no doubt is possible, transition may be indicated by topmarks as described above added to the limiting marks of the two systems.

See diagrams facing page 32. These diagrams illustrate the uniform systems of buoyage as agreed at the London Conferences of 1933 and

1936. The following article gives a detailed description of the two systems.

Lateral system.—This system is generally used for marking well-defined fairways. The term " starboard-hand " denotes that side which would be on the right hand of the mariner either going with the main flood tidal stream or approaching or entering a harbour, river or estuary from seaward. The term " port-hand " denotes the left hand of the mariner in the same circumstances.

Starboard-hand marks are conical and are painted black or black and white in chequers.

Starboard-hand topmarks, if any, consist of black cones, or for purposes of differentiation, except at the entrance to a channel, of black diamonds.

Lights on starboard hand marks, if any, consist of *white flashing* or *white occulting* lights exhibiting *one, three* or *five* flashes or eclipses ; or *green* lights with a character different to those allocated to wreck-marks.

Port-hand marks are can-shaped and are painted red or red and white in chequers.

Port-hand topmarks, if any, consist of red cans, or for purposes of differentiation, except at the entrance to a channel, of red **T**'s.

Lights on port hand marks, if any, consist of *red flashing* or *red occulting* lights exhibiting *any number* of flashes or eclipses *up to four*, or *white flashing* or *white occulting* lights exhibiting *two, four* or *six* flashes or eclipses.

The ends of middle grounds are marked by spherical buoys, which are painted in horizontal bands, red and white where the main channel is on the starboard hand, or the channels are of equal importance, and black and white where the main channel is on the port hand.

Middle ground topmarks, if any, when the main channel is on the starboard hand, consist of red cans on the outer marks and red **T**'s on the inner marks. When the main channel is on the port hand the topmarks, if any, consist of black cones on the outer marks and black diamonds on the inner marks. When the channels are of equal importance the topmarks, if any, consist of red globes on the outer marks and red St. George's crosses on the inner marks.

Lights on middle ground marks, if any, will, as far as is possible, be distinctive, and neither colour nor rhythm will be such as to lead to uncertainty as to the side on which the marks should be passed.

Mid-channel marks are of distinctive shapes different from the principal characteristic shapes (conical, can and spherical). They are painted in vertical stripes either black and white or red and white.

Mid-channel topmarks, if any, are of distinctive shapes other than cone, can or globe.

Lights on mid-channel marks, if any, are different from the neighbouring lights at the sides of the channel.

Isolated danger marks are spherical and are painted black and red in wide horizontal bands separated by a narrow white band.

Isolated danger topmarks, if any, consist of a globe painted black or red, or half black and half red horizontally.

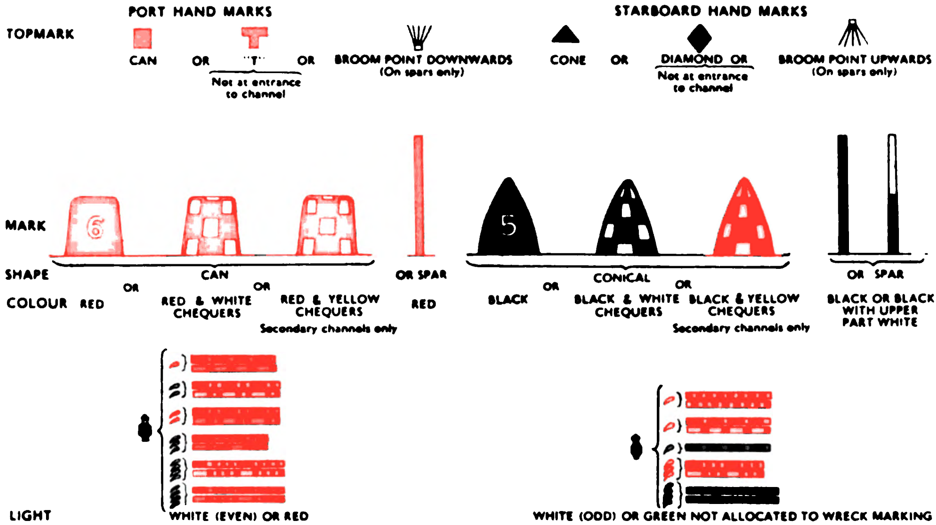
Lights on isolated danger marks, if any, are *flashing*, either *white* or *red*.

Fairway marks which serve to indicate the seaward approach to a harbour, river or estuary are similar in shape and colour to mid-channel marks, *see* above.

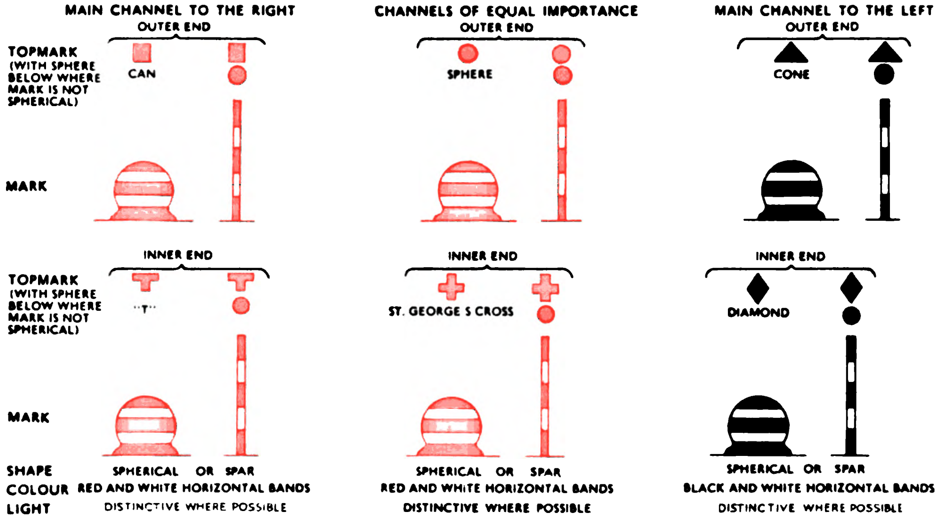
Lights on fairway marks, if any, are *flashing*.

DIAGRAMS ILLUSTRATING THE UNIFORM SYSTEM OF BUOYAGE

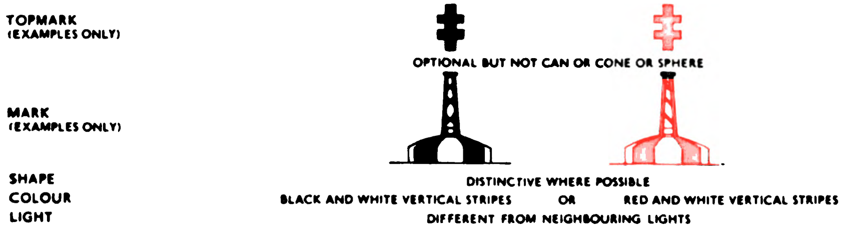
LATERAL SYSTEM



MIDDLE-GROUND OR BIFURCATION OR JUNCTION MARKS

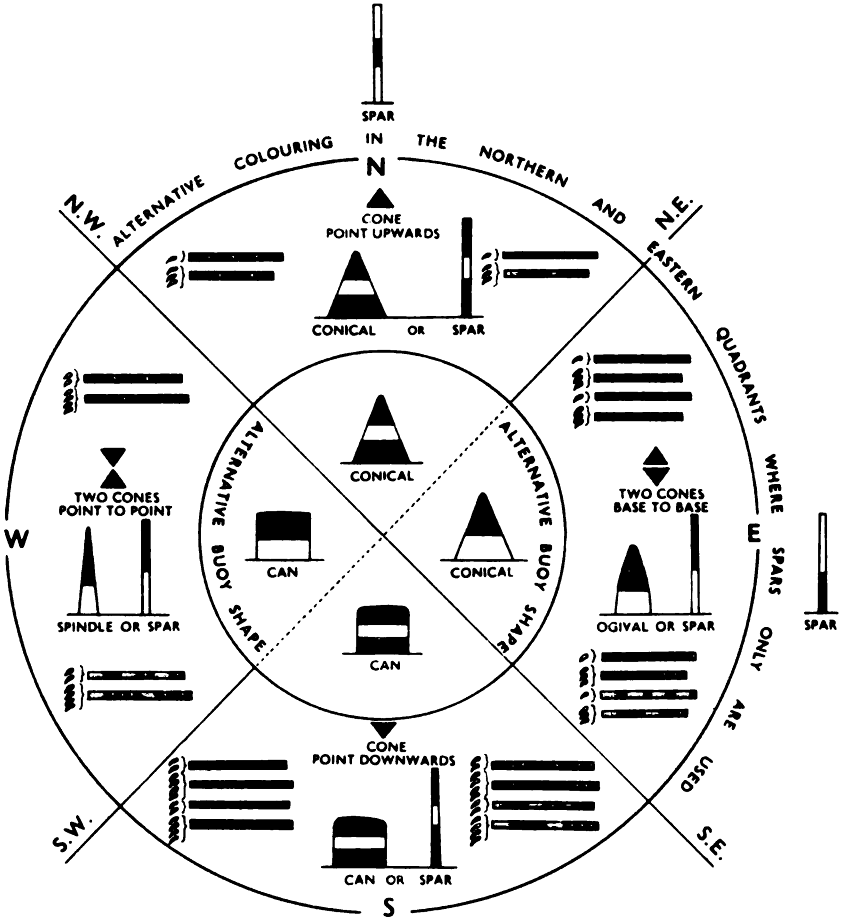

MAIN CHANNEL TO THE RIGHT
OUTER END
CHANNELS OF EQUAL IMPORTANCE
OUTER END
MAIN CHANNEL TO THE LEFT
OUTER END
TOPMARK (WITH SPHERE BELOW WHERE MARK IS NOT SPHERICAL)
CAN
SPHERE
CONE
MARK
INNER END
INNER END
INNER END
TOPMARK (WITH SPHERE BELOW WHERE MARK IS NOT SPHERICAL)
"T"
ST. GEORGE S CROSS
DIAMOND
MARK
SHAPE
COLOUR
LIGHT
SPHERICAL OR SPAR
RED AND WHITE HORIZONTAL BANDS
DISTINCTIVE WHERE POSSIBLE
SPHERICAL OR SPAR
RED AND WHITE HORIZONTAL BANDS
DISTINCTIVE WHERE POSSIBLE
SPHERICAL OR SPAR
BLACK AND WHITE HORIZONTAL BANDS
DISTINCTIVE WHERE POSSIBLE

MID-CHANNEL MARKS


TOPMARK (EXAMPLES ONLY)
OPTIONAL BUT NOT CAN OR CONE OR SPHERE
MARK (EXAMPLES ONLY)
SHAPE
COLOUR
LIGHT
DISTINCTIVE WHERE POSSIBLE
BLACK AND WHITE VERTICAL STRIPES
OR
RED AND WHITE VERTICAL STRIPES
DIFFERENT FROM NEIGHBOURING LIGHTS

DIAGRAMS ILLUSTRATING THE UNIFORM SYSTEM OF BUOYAGE

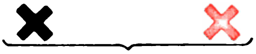
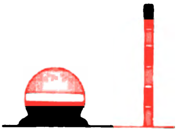
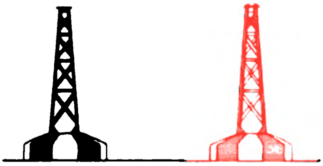
CARDINAL SYSTEM

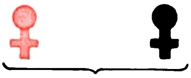
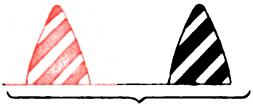
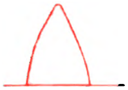


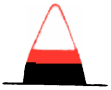
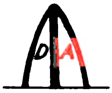
NOTE. SLIGHT MODIFICATIONS IN MINOR DETAILS TO THE ABOVE HAVE BEEN INTRODUCED BY CERTAIN COUNTRIES

DIAGRAMS ILLUSTRATING THE UNIFORM SYSTEM OF BUOYAGE

MARKS COMMON TO BOTH SYSTEMS AND OTHER MARKS

	ISOLATED DANGER MARKS	FAIRWAY MARKS
TOPMARK	● OR ● OR ● SPHERE	 OPTIONAL (SEE FOOTNOTE)
MARK		
SHAPE	SPHERICAL OR SPAR	OPTIONAL (SEE FOOTNOTE)
COLOUR	WIDE BLACK AND RED HORIZONTAL BANDS SEPARATED IF DESIRABLE BY A NARROW WHITE BAND	BLACK AND WHITE VERTICAL STRIPES OR RED AND WHITE VERTICAL STRIPES
LIGHT	FLASHING (WHITE OR RED)	FLASHING

	TRANSITION MARKS	QUARANTINE-GROUND MARKS
TOPMARK	 OPTIONAL (SEE FOOTNOTE)	
MARK		
SHAPE	OPTIONAL (SEE FOOTNOTE)	OPTIONAL (SEE FOOTNOTE)
COLOUR	RED AND WHITE DIAGONAL STRIPES OR BLACK AND WHITE DIAGONAL STRIPES	YELLOW

	OUTFALL AND SPOIL-GROUND MARKS	AREAS USED FOR NAVAL, MILITARY, OR AIR FORCE PRACTICE PURPOSES
MARK		
SHAPE	OPTIONAL (SEE FOOTNOTE)	OPTIONAL (SEE FOOTNOTE)
COLOUR	YELLOW ABOVE AND BLACK BELOW	WHITE WITH BLUE CROSS

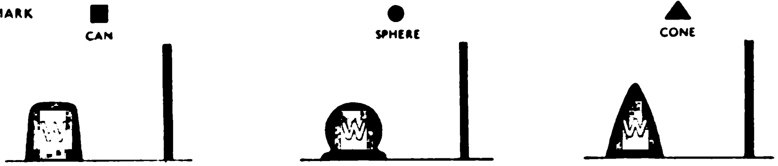
FOOTNOTE SHAPE IS OPTIONAL AND THE ILLUSTRATIONS ARE TO BE REGARDED AS EXAMPLES ONLY THE ONLY DEFINITE REQUIREMENT IS THAT THE SHAPE ADOPTED SHALL NOT BE MISLEADING

DIAGRAMS ILLUSTRATING THE UNIFORM SYSTEM OF BUOYAGE

MARKING OF WRECKS

LATERAL SYSTEM

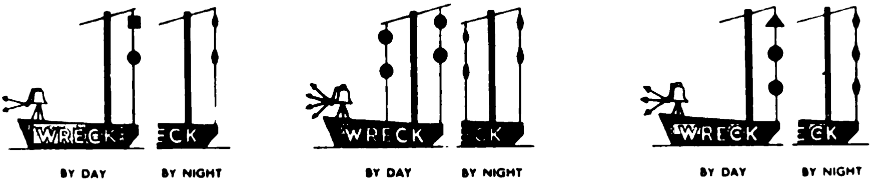
BUOYS



	TO BE PASSED ON THE PORT HAND		TO BE PASSED ON EITHER HAND		TO BE PASSED ON THE STARBOARD HAND	
TOPMARK	CAN		SPHERE		CONE	
SHAPE	CAN	OR SPAR	SPHERICAL	OR SPAR	CONICAL	OR SPAR
COLOUR	GREEN	PREDOMINANT COLOUR GREEN LOWER PART RED	GREEN	GREEN	GREEN	PREDOMINANT COLOUR GREEN LOWER PART BLACK
LIGHT	GREEN - DOUBLE FLASHING		GREEN - SINGLE OCCULTING		GREEN - TRIPLE FLASHING	

VESSELS

	TO BE PASSED ON THE PORT HAND	TO BE PASSED ON EITHER HAND	TO BE PASSED ON THE STARBOARD HAND
SHAPES	SPHERE SURMOUNTED BY A CAN IN A VERTICAL LINE	FOUR SPHERES DISPOSED VERTICALLY BY PAIRS	TWO SPHERES SURMOUNTED BY A CONE POINT UPWARDS IN A VERTICAL LINE

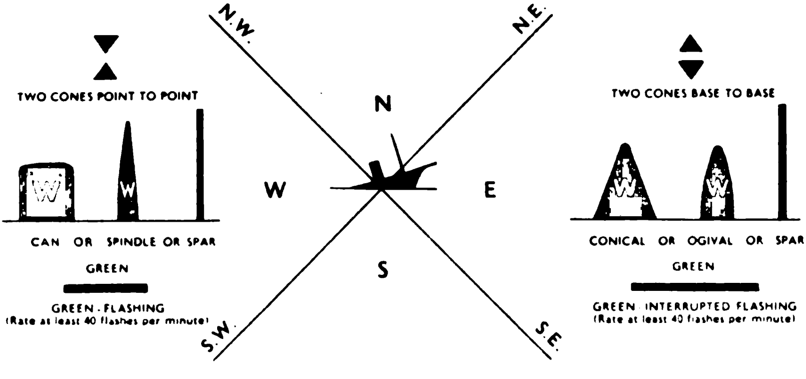


COLOUR GREEN WITH WHITE INSCRIPTION

LIGHT FIXED GREEN AND TO CORRESPOND IN NUMBER AND ARRANGEMENT TO THE SHAPES

BELL	TWO STROKES	FOUR STROKES	THREE STROKES

CARDINAL SYSTEM



TOPMARK	TWO CONES POINT TO POINT	TWO CONES BASE TO BASE
SHAPE	CAN OR SPINDLE OR SPAR	CONICAL OR OGIVAL OR SPAR
COLOUR	GREEN	GREEN
LIGHT	GREEN - FLASHING (Rate at least 40 flashes per minute)	GREEN INTERRUPTED FLASHING (Rate at least 40 flashes per minute)

C.B.H. 20796 - Wt. 28450 - Dd. H.0258 - 25000 - 1/52
21959 - 21214 - H('54 120000-9/52

Buoys on the same side of a channel, estuary or tide-way, may be distinguished from each other by names, numbers or letters.

Cardinal system.—This system is used along coasts which are fringed with reefs or isolated dangers. The marks vary in character according to the quadrant of the true compass in which they are situated with reference to the danger which they mark.

For this purpose the true compass card is divided into four quadrants, called North, East, South and West, which are bounded by the bearings north-east, south-east, south-west and north-west from the danger point.

The quadrant in which the mark lies can be identified by the characteristics of the mark as follows:—

North quadrant:—The buoys are conical, painted black with a wide, white horizontal band in the middle, and are surmounted by two cones points up.

Lights, if any, are preferably, *white quick-flashing* or else *white flashing* or *white occulting* exhibiting an *odd* number of *flashes* or *eclipses.*

East quadrant:—The buoys are conical, painted the upper part red and the lower part white, and are surmounted by two cones bases together.

Lights, if any, are preferably *red quick-flashing* or else *red flashing* or *red occulting* exhibiting an *odd* number of *flashes* or *eclipses.*

South quadrant:—The buoys are can-shaped, painted red with a wide, white horizontal band in the middle, and are surmounted by two cones points down.

Lights, if any, are preferably, *red flashing* exhibiting an *even* number of *flashes*, or else *red occulting* exhibiting an *even* number of eclipses.

West quadrant:—The buoys are can or spindle-shaped, painted the upper part black and the lower part, white, and are surmounted by two cones points together.

Lights, if any, are preferably, *white flashing* exhibiting an *even* number of *flashes*, or else *white occulting* exhibiting an *even* number of *eclipses.*

Isolated danger marks and fairway marks are the same as in the lateral system.

Wreck marking.—Wrecks may be marked either by the Lateral or the Cardinal system.

Green is the predominant colour used for all purposes connected with wreck-marking, viz:—For vessels, buoys, daymarks, lights &c., vessels and buoys have the letter **W** and the word " wreck " in the language of the country under whose authority they lie, painted on them in white letters.

Lateral system.—

Wreck-marking buoys which are:—

(*a*) To be passed on the mariner's port hand:—
A can-shaped buoy, and, if lighted, exhibiting a *green flashing* light showing *two* flashes.

(*b*) To be passed on the mariner's starboard hand:—
A conical buoy, and, if lighted, exhibiting a *green flashing* light showing *three* flashes.

(*c*) To be passed on either side:—
A spherical buoy, and, if lighted, exhibiting a *green occulting* light showing *one* eclipse.

Wreck-marking vessels:—

I. Lights, exhibited between sunset and sunrise:—

(*a*) To be passed on the mariner's port hand:—
Two *fixed green* lights disposed vertically above the hull.

(*b*) To be passed on the mariner's starboard hand :—
Three *fixed green* lights, disposed vertically above the hull.

(*c*) To be passed on either side :—
Four *fixed green* lights placed in pairs on each end of a cross-yard ; the lights of each pair being disposed vertically above the hull.

Note.—The ordinary riding light for a vessel at anchor is not exhibited.

II. Shapes :—Between sunrise and sunset green balls or shapes corresponding in number and arrangement to the *green* lights.

III. Fog signal, rung on a deep-toned bell at intervals of not more than 30 seconds.

(*a*) To be passed on the mariner's port hand—2 strokes in succession.

(*b*) To be passed on the mariner's starboard hand—3 strokes in succession.

(*c*) To be passed on either side—4 strokes in succession.

Cardinal system.—Under this system, wreck marks are placed only in the East or West quadrants and have the following characteristics :—

East quadrant marks are conical painted green, and are surmounted by two cones bases together.

Lights, if any, are *green flashing,* exhibiting groups of *quick flashes* separated by periods of eclipse.

West quadrant marks are can or spindle-shaped, painted green, and are surmounted by two cones points together.

Lights, if any, are *green flashing.*

Caution.—In both systems if buoys of the principal characteristic shapes (i.e. conical, can and spherical) are not available, buoys of other shapes or spar buoys may be used in their places. Such buoys will be painted in a similar manner to the marks they replace, and, if lighted, will exhibit lights with similar characteristics. The body of this volume should invariably be consulted for all details of buoyage at particular places.

Union of South Africa.—For systems in use, *see* under appropriate parts in the body of this work.

Moçambique.—The lateral system is in force.

General Caution.—Owing to changes in channels and shoals, the positions of the buoys require alteration from time to time, and those exposed to the sea, the influence of tidal streams, the freshets or floods of rivers, frequently break adrift. A buoy which has drifted from its moorings may seriously mislead, if assumed as being in position.

PILOTAGE.—Pilotage is compulsory for merchant vessels entering or leaving the following harbours :—

Union of South Africa.—Cape Town, Knysna (within the river), Port Elizabeth, East London and Durban.

Moçambique.—Lourenço Marques, Beira, Porto de Antonio Enes and Porto de Moçambique.

Tanganyika.—Dar es Salaam harbour, Tanga inner harbour, Lindi, Mikindani and Mtwara harbours.

Kenya Colony and Protectorate.—The Port of Mombasa.

For further details *see* under **REGULATIONS,** page 36.

COMMUNICATIONS.—Sea.—*Union of South Africa.*—There is frequent and regular communication between Europe and the Union of South Africa both via the Atlantic Ocean, including Madeira or the Canary Islands, and via the Suez Canal and the east coast of Africa; there is also frequent and regular communication between the principal ports of the Union and those on the east coast of Africa.

There is regular communication between Cape Town, Durban and Australia; between Durban and India, via East African ports and Bombay; and there is periodical direct communication between ports in the Union and the Orient, via Madagascar and the East Indies.

Moçambique.—The principal ports in Moçambique have regular communications as follows:—With the Union of South Africa; with Europe, via the Suez Canal; with India via other East African ports and Bombay; and there is periodical communication with the Orient via the East Indies.

British East Africa.—The principal ports in Tanganyika Territory, Zanzibar Protectorate and Kenya Colony and Protectorate have frequent and regular communication with Europe via the Suez canal; with the Union of South Africa via ports in Moçambique; with India via Bombay and Calcutta. There is periodical communication with the Orient via the East Indies, and also with Madagascar and Mauritius.

There is also a regular local service between Zanzibar, Pemba, Dar es Salaam and Mombasa.

Somalia.—There is frequent and regular communication between ports in Somalia and Europe, via the Suez canal, and there is periodical communication between the former ports and ports in the Union of South Africa via East African ports.

Land.—Communications by railway are described under the general descriptions of the various political divisions.

Air.—There is regular air service between the Union of South Africa and the United Kingdom, via Durban, Lourenço Marques, Beira, Porto de Moçambique, Lindi, Dar es Salaam and Mombasa.

There is also regular air service between the Union of South Africa and the Rhodesias, Tanganyika and Kenya, via Johannesburg and Kisúmu on Lake Victoria.

In addition to the above services, the following regular air services were in operation in 1949:—

Union of South Africa.—Johannesburg to Durban; Johannesburg to Cape Town; Johannesburg to Port Elizabeth; Johannesburg to Lourenço Marques, Cape Town to Loanda in Portuguese West Africa; and a coastal service between Cape Town and Durban, via Port Elizabeth and East London.

Moçambique.—Lourenço Marques to Johannesburg; Lourenço Marques to Moçimboa da Praia vîa Inhambane, Beira, Quelimane, Lumbo and Porto Amelia.

British East Africa.—Dar es Salaam to Nairobi vîa Zanzibar, Tanga and Mombasa; Dar es Salaam to the island of Mafia; and Dar es Salaam to Mtwara vîa Lindi.

Radio telegraph stations.—The following radio stations in the area covered by this volume are open for public correspondence:—

Union of South Africa.—Port Elizabeth, Capetown, Durban.

Moçambique.—Lourenço Marques, Beira, Porto de Moçambique.

Tanganyika Territory.—Dar es Salaam, Lindi.

Kenya Colony and Protectorate.—Mombasa.

Somalia.—Chisimao, Mogadiscio.

For details *see* list published by the General Secretariat of the International Telecommunication Union.

For details of radio stations which transmit weather bulletins, storm signals, navigational warnings, time signals, etc., *see* Admiralty List of Radio Signals.

Telegraphs.—Telephones.—All towns and most of the important villages on the coast of Africa, covered by this volume, are connected to the general telegraph system, and most of them to the general telephone system.

Standard and Summer Times.—All information regarding Standard Times and Summer Times will be found in the Admiralty List of Radio Signals, Volume V.

FUEL.—Coal.—Large supplies of coal are obtainable at Cape Town, East London, Durban, Lourenço Marques, Zanzibar and Kilindini, and small supplies at Port Elizabeth.

Fuel oil.—Fuel oil may be obtained at Cape Town, Durban and Kilindini, and small supplies at Port Elizabeth, East London, Lourenço Marques and Lindi.

Diesel Oil.—Diesel oil is obtainable at Cape Town, Durban and Kilindini. There is a moderate supply at Beira and very small quantities at Moçambique and Tanga.

REPAIRS.—Repairs to hulls and machinery can be carried out at Cape Town, Port Elizabeth, East London and Durban. The Naval dockyard at Simonstown is available to merchant vessels in case of emergency. Minor repairs can be effected at Mossel bay, Lourenço Marques, Beira, Dar es Salaam, Zanzibar and Kilindini, and to small vessels at Quelimane.

There are dry docks at Cape Town, Simonstown, East London, Durban and Lourenço Marques, and patent slips at Mossel bay, Zanzibar and Kilindini. There is also a small dry dock at Beira, but it is maintained only for private use.

Dimensions of the largest dock or patent slip, at ports where these facilities exist, are given in Appendix II.

BRITISH CONSULAR OFFICERS.—British Consular Officers are stationed at Lourenço Marques and Beira.

REGULATIONS.—Harbours of the Union of South Africa.—The ports and harbours in the Union of South Africa are under the administration of South African Railways and Harbours. The following are extracts from the Regulations for the Harbours of the Union of South Africa, 1932 :—

Before entering a harbour every ship shall hoist her national colours.

No ship shall enter a harbour until the proper signal shall have been hoisted at the signal station authorizing such entry, but this regulation shall not apply to a ship entering the outer anchorage of any harbour.

The Port Captain or any deputy he may appoint for the purpose will between the hours of sunrise and sunset board any ship arriving in the harbour as soon as practicable after her arrival, and, if possible, previous to her coming to an anchor, in order that he may point out a proper berth to the master of the ship, and in case he should be prevented from so boarding, owing to quarantine regulations or other good cause, he will point out a proper berth for such ship, and may, if it shall appear to him necessary, order the ship to shift or change her berth to any other berth he may point out.

The master of every ship having on board explosives, cartridges, fuzes, matches, fireworks, acids, calcium carbide, or other goods of a dangerous or inflammable nature, shall on arrival give notice thereof to the Port Captain, and such cargo may not be landed before the delivery, forwarding, or warehousing orders are handed in to the Administration.

The master of every ship shall buoy his anchors, and should any anchor, chain, or cable belonging to any ship have parted or have been slipped within a harbour, the master of such ship shall forthwith report the fact to the Port Captain and shall give to him the bearings of the spot where such anchor parted or was slipped.

No stones, gravel, ballast, carcasses, cargo, dirt, ashes, bottles, booklets, rubbish or any objectionable or malodorous matter shall be thrown into any harbour, but the master of every ship shall cause anything of this nature to be removed day by day ; nor shall oil of any description be discharged into or allowed to escape into a harbour.

The harbours of Table bay, Knysna, Port Elizabeth, East London and Durban are compulsory pilotage harbours, and the employment of a pilot within the undermentioned areas when entering or leaving those harbours or shifting berth therein is compulsory, save in respect of such ships as may obtain a special exemption licence from the Administration.

Table bay and Durban : The whole of the docks or inner harbour and within the entrance and the approaches thereto.

Knysna : Within the river.

Port Elizabeth : The area enclosed by the breakwater and the North Arm, together with the entrance and the approaches thereto.

East London : Within the Buffalo river and the entrance thereto.

At certain of the harbours where pilotage is not compulsory the Administration may, for reasons of convenience and in the interests of shipowners, appoint pilots who are servants of the Administration ; such pilots may only render their services to ships upon the condition that the Administration shall not be liable for any loss or damage that may arise or be caused through the act, omission or default of any such pilot.

In addition to any other regulations on the subject, the following regulations shall apply at the harbours to ships conveying or discharging inflammable liquids in bulk :—

Immediately upon arrival at a harbour within the Union of any ship having on board inflammable liquids in bulk, the master shall furnish particulars thereof in writing to the Port Captain.

The master of every such ship shall, while remaining within the limits of the harbour, conspicuously display by day a red flag not less than 3 feet ($0^{m}9$) square, with a white circular centre 6 inches in diameter, and by night a *red* light at the masthead or where it can best be seen but not less than 20 feet ($6^{m}1$) above the deck.

Zanzibar Protectorate.—The master of every vessel arriving within the Protectorate from any port or place without, shall call at the Port of Zanzibar prior to proceeding to any other port within the Protectorate.

Ports in Somalia.—Sailing vessels, boats under power or otherwise, and tugs or other small craft within a radius of one mile of the entrance to, or within the waters of ports, or in channels, estuaries and rivers in Somalia, must keep clear of all power vessels entering or leaving. Power vessels observing a breach of these regulations should give not less than four short blasts on their whistles or sirens.

Power vessels navigating in the above areas should do so with caution and at a reduced speed.

Simons bay.—Regulations for dockyard port.—*See* Appendix I.

QUARANTINE.—The standard Quarantine message, laid down in Volume II. of the International Code of Signals, must be transmitted from all vessels intending to visit a port in the Union of South Africa direct from a foreign port. The message must be sent to the Port Health Officer at Cape Town, Durban or Port Elizabeth, and items I. to V., inclusive, are obligatory.

DERATISATION.—Deratisation can be carried out, and Deratisation and Deratisation Exemption Certificates can be issued to vessels at the following ports within the limits of this book :—Cape Town, Durban, Lourenço Marques and Zanzibar.

Chart 5306.

PASSAGES.—Caution.—Information with regard to general passages will be found in the Admiralty publication " Ocean Passages for the World " ; passages along the southern and eastern coasts of Africa are described below.

Mariners should remember that off all parts of the southern coast of Africa, and especially off salient points, sunken wrecks or uncharted dangers may exist close inshore. It is therefore inadvisable to approach this exposed coast, even in full-powered vessels, within a distance of 3 or 4 miles, and sailing vessels should give Cape Agulhas a berth of 7 or 8 miles. With a strong adverse current the temptation to approach the coast is great, but westward of Algoa bay nothing is to be gained by so doing, and a breakdown of the machinery or any temporary error in the course may lead to disaster.

Cape Town to Gulf of Aden and intermediate ports.—Power vessels.—At all seasons, round the Cape of Good Hope at a safe distance, thence steer along the coast at a safe distance as far as Algoa bay, thus avoiding the strength of the Agulhas current, and at times receiving the benefit of a countercurrent, which may extend from one to 6 miles offshore, especially between Cape Agulhas and the mouth of the Kowie river ; care must be taken to guard against indraughts and to avoid all salient points.

From Algoa bay, if calling at Durban, continue to steer along the coast ; detailed directions for this part of the coast are given on pages 140 and 171. These directions recommend keeping close to the coast and it should be remembered that the general direction of the current is roughly parallel with the coast, so that if at any time the course being steered is inclined towards the coast, the position made good will, in all probability, be nearer the coast than that reckoned only from the course steered. Soundings will, however, indicate if the vessel is being set towards or away from the coast. At night, vessels should keep in depths of more than 40 fathoms (73^{m}2) when southward of South Sand bluff light, and in depths of more than 30 fathoms (54^{m}9), when between that light and Cape Natal. It should be borne in mind that the distance from breakers is always very much more difficult to judge correctly on a clear moonlight night than on a dark clear night.

If not calling at Durban or at other intermediate ports, vessels

Charts 748a, 748b, 2483.

Chart 5306.

should keep from about 80 to 100 miles from the coast, where the current is weak, and should steer direct for the middle of the Moçambique channel, approaching the coast again when in the vicinity of Porto de Moçambique, if bound for that port, but bearing in mind that the current sets southward at from 2 to 4 knots when within about 60 or 70 miles of that part of the coast, and is at its strongest during the north-east monsoon.

On account of the uncertain set of the currents in the Moçambique channel, frequent observations for ascertaining a vessel's position are imperatively necessary.

If bound for Zanzibar, pass westward of Îles Comores, and thence steer direct, sighting the northern end of the island of Mafia and passing westward of Fungu Kizimkazi.

If bound to the Gulf of Aden, proceed as direct as safe navigation permits for rounding Capo Guardafui.

Gulf of Aden and intermediate ports to Cape Town.—Power vessels.—Generally speaking, southward-bound vessels from ports on the east coast of Africa should pass at a sufficient distance from the coast to take advantage of the Moçambique and Agulhas currents; this will be about 30 miles from the coast in the vicinity of Porto de Moçambique, and, after passing through the Moçambique channel, about 20 miles from the coast as far as Mossel bay. In the event of meeting a south-westerly gale off this latter part of the coast, a very dangerous sea will be experienced at or outside the edge of the 100-fathom (182^{m}9) bank; *see* page 140. Considerably less sea is experienced if a vessel can keep near the coast, and if a vessel keeps about 3 miles, or less if possible, offshore, the reduction in the sea more than compensates for the loss of the favourable current; at night, however, vessels should keep in depths of more than 40 fathoms (73^{m}2). If proceeding to Cape Town, from abreast Mossel bay course should be shaped to round Cape Agulhas at a safe distance and thence for rounding the Cape of Good Hope.

Charts 4301, 5302.

CLIMATE AND WEATHER.—General summary of the weather in the area covered by this volume.—The part of this area southward of about Latitude 25° S. borders on the "roaring forties," and there are many gales, especially from April to October, mostly from between south-west and north-west. On the whole there is very little fog.

Between about Latitude 25° S. and the equator gales are not frequent, but cyclones, although uncommon, may possibly be encountered between about Latitude 25° S. and Latitude 3° S. Although the high land of Madagascar partly protects the Moçambique channel from these storms, those which enter that channel are sometimes extremely severe. There is virtually no fog off the coast.

Northward of the equator there is an alternation between the south-westerly and the north-easterly monsoons. In the south-westerly monsoon from June to August, northward of about Latitude 8° N., there are generally 10 days of gale (force 8 or more) per month and of these a very high proportion is from south or south-south-west.

Coastal weather of the Union of South Africa.—Summary.—The weather off these coasts is similar to that of the zone well known to

Charts 748a, 748b, 2483.

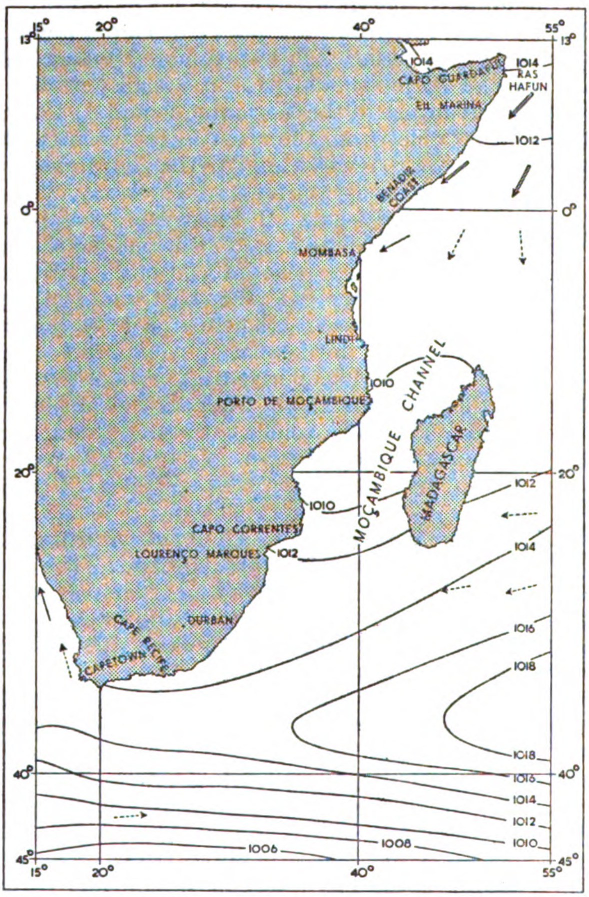
Charts 4301, 5302.

seamen as the " roaring forties " for the frequency in all seasons of its stormy westerly winds, but on the coasts of the Union the directions from which gales and squalls blow vary from place to place and are largely governed by local topography. The winter half of the year (May to October) is the stormiest.

It is on the whole a warm region, in which frost is almost unknown. Temperature sometimes exceeds 100° F. in summer, but very sudden changes of temperature are common in all seasons, and south-westerly and southerly winds are often chilly in winter. Rainfall on the east coast averages about twice that of south-east England but on the

Charts 748a, 748b, 2483.

Figure 3.



Mean Barometric Pressure and Predominant Winds.

January.

The arrows show the direction of the predominant wind, if its constancy is at least 51%, according to the following scheme :—

- - -➤ 51–60%   ——➤ 61–80%   ⟹ 81–100%

Predominance is judged in relation to that quadrant (90°), not necessarily bounded by the four cardinal points, which shows the greatest number of winds.

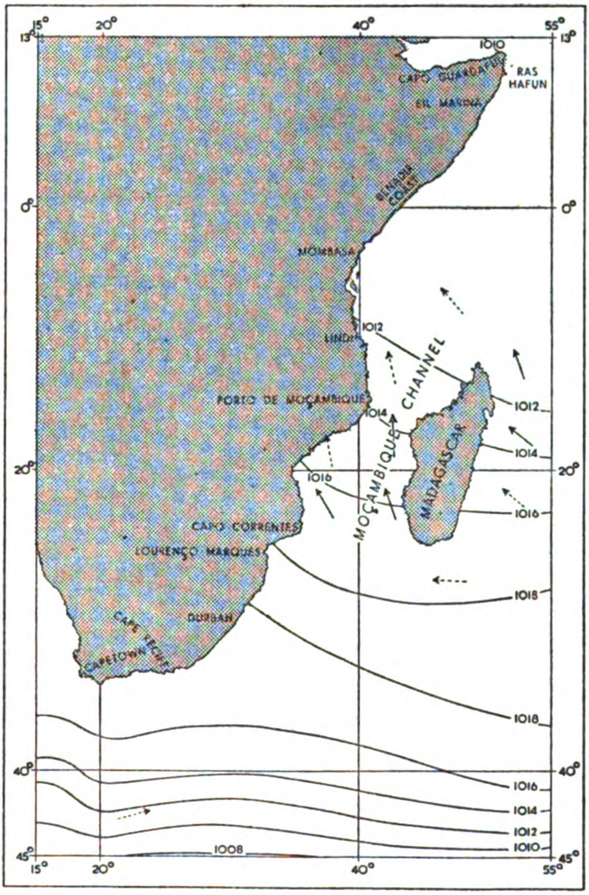
Charts 4301, 5302.

south coast those regions that are sheltered from westerly winds are comparatively dry. There is little fog.

Pressure.—In midwinter (July) the Union lies on a westward extension of the high pressure area of the South Indian Ocean. In midsummer (January) average pressure is comparatively low over the interior of the Union, and the high pressure areas of the South Atlantic and Indian oceans then lie to westward and eastward respectively. The distribution of pressure is of the summer type from about November to April and of the winter type from May to October (*see* Figures 3 to 6). Throughout the year there is a rapid decrease of average

Charts 748a, 748b, 2483.

Figure 4.



Mean Barometric Pressure and Predominant Winds.
April.

Only winds of force 3 or more are taken into account in estimating predominance. The arrow shows the direction bisecting the quadrant, and the constancy is defined as the percentage relation between the number of winds from that quadrant, of forces 3–12, and the total number of winds observed from all directions (including forces 0–2).

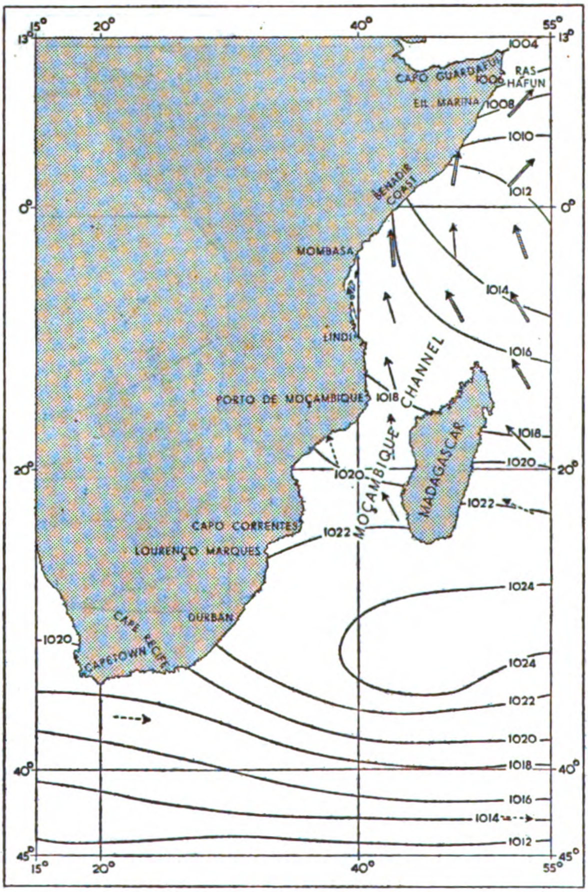
Charts 4301, 5302.

pressure southward of the south coast, mean pressure continuing to fall even beyond Latitude 50° S.

Although the movements of the centres of the principal depressions of high latitudes cannot be traced with precision, it is practically certain that the majority move in some direction between south-east and north-east, with a speed which has been estimated to average slightly more than 30 knots in winter and about 30 knots in summer. The secondary troughs associated with them, and the occasional intervening anticyclones, many of which have closed isobars, exert considerable influence on the winds and weather of the Union. The

Charts 748a, 748b, 2483.

Figure 5.



Mean Barometric Pressure and Predominant Winds.

July.

The arrows show the direction of the predominant wind, if its constancy is at least 51%, according to the following scheme :—

⟶ 51–60% - - -→ 61–80% ⟹ 81–100%

Predominance is judged in relation to that quadrant (90°), not necessarily bounded by the four cardinal points, which shows the greatest number of winds.

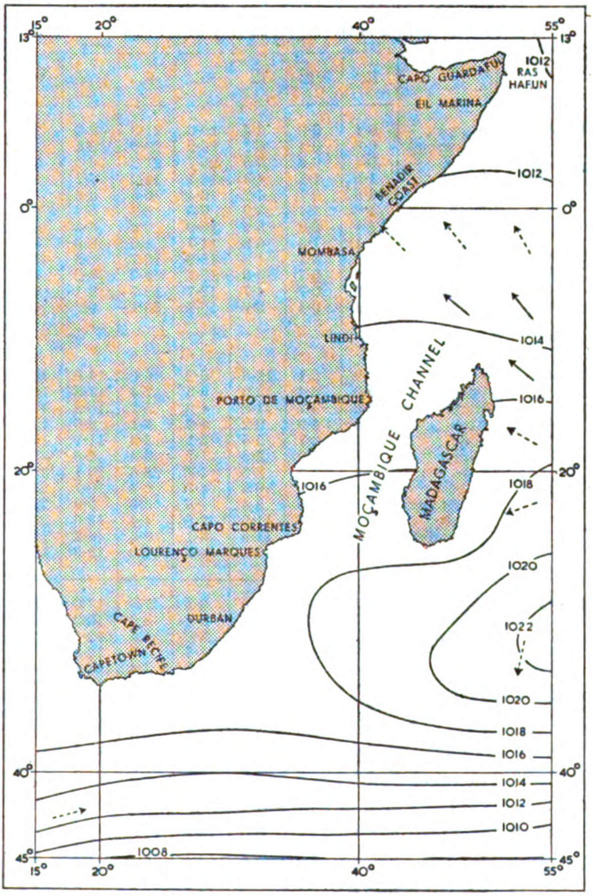
Charts 4301, 5302.

troughs often appear to travel in a direction nearly the same as that of the general trend of the coast-line, travelling south-eastward while approaching the south-west coast, and eastward off the south coast. On the east coast they move north-north-eastward and generally lose intensity as they approach the Moçambique channel. In addition to the secondary troughs, there are occasional secondary depressions, with closed isobars, that travel in a similar way. Both kinds of disturbances are more prominent in winter than in summer.

There is an annual variation of average pressure over the whole country. In January mean pressure is about 1014 mb. and in July

Charts 748a, 748b, 2483.

Figure 6.



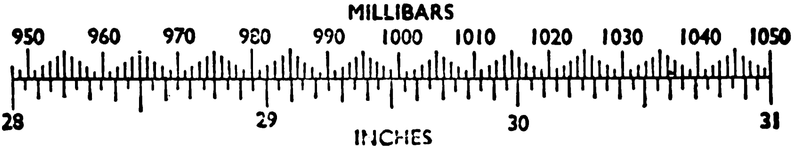
Mean Barometric Pressure and Predominant Winds.
October.

Only winds of force 3 or more are taken into account in estimating predominance. The arrow shows the direction bisecting the quadrant, and the constancy is defined as the percentage relation between the number of winds from that quadrant, of forces 3–12, and the total number of winds observed from all directions (including forces 0–2).

Charts 4301, 5302.

between 1020 mb. and 1024 mb. (*see* also Figures 3 to 6 and the climatic tables, pages 64-80). There is also a diurnal variation of pressure, which is often masked by larger irregular changes, mean pressure being highest at about 1000 and 2200 local time, and lowest at about 0400 and 1600. The range of this variation is between 2 and 3 mb. at Durban and between 1 and 2 mb. at Cape Town.

From the following diagram the approximate conversion of pressures in millibars to their equivalents in inches of mercury can be effected, and vice versa.



UNION OF SOUTH AFRICA

			N.	NE.	E.	SE.	S.	SW.	W.	NW.	Total %
30°–35° S.	15°–20° E.	January	0·4	0·0	4·4	19·6	21·3	12·0	3·9	1·8	63·4
		February	0·8	0·4	6·7	20·2	20·5	9·1	3·5	1·8	63·0
		March	0·4	0·3	5·5	20·7	21·3	6·4	3·7	2·8	61·1
		April	1·5	1·1	4·4	16·1	14·2	7·1	5·0	2·8	52·2
		May	3·8	0·7	4·2	10·4	6·8	5·4	7·0	11·3	49·6
		June	4·8	1·4	3·9	9·5	5·2	5·4	8·1	12·3	50·6
		July	4·1	0·8	3·9	10·9	6·3	6·3	8·2	10·5	51·0
		August	4·1	1·3	6·2	11·7	8·0	6·9	9·2	12·7	60·1
		September	2·3	1·1	4·8	15·8	10·7	8·5	6·5	7·5	57·2
		October	1·6	0·7	4·0	17·1	9·0	8·2	8·2	5·1	53·9
		November	0·9	0·7	4·7	12·7	18·7	9·1	7·3	5·2	59·3
		December	0·4	0·4	3·7	16·7	25·1	9·7	4·2	1·8	62·0
Coast to 40° S.	20°–25° E.	January	0·9	2·1	12·8	6·2	6·0	14·6	13·1	2·1	57·8
		February	1·0	3·4	12·9	6·3	7·4	11·8	12·7	3·0	58·5
		March	1·0	3·7	11·8	4·9	5·7	10·2	10·9	2·5	50·7
		April	2·4	4·0	9·2	4·3	6·1	8·6	15·3	3·7	53·6
		May	3·1	3·1	5·5	3·1	3·9	11·7	19·4	8·8	58·6
		June	4·7	3·9	2·8	1·7	3·3	8·8	27·8	10·6	63·6
		July	2·8	2·6	2·6	1·7	3·6	10·1	31·3	10·4	65·1
		August	3·4	4·9	6·5	4·7	6·4	10·7	24·2	7·4	68·2
		September	2·2	4·0	8·4	4·8	6·6	9·9	22·2	6·3	64·4
		October	1·7	5·8	11·9	2·8	4·4	13·6	20·2	4·7	65·1
		November	1·2	2·5	11·6	6·1	8·6	9·2	15·2	3·1	57·5
		December	1·1	2·9	8·1	4·8	6·0	13·9	17·0	2·0	55·8
30°–35° S.	25°–30° E.	January	1·7	10·2	9·0	3·1	7·8	17·0	6·6	1·2	56·6
		February	2·7	12·7	12·5	5·2	8·6	10·3	6·9	0·6	59·5
		March	2·2	12·4	7·3	5·2	5·6	12·1	9·8	1·9	56·5
		April	5·3	12·0	4·6	1·3	4·3	16·5	8·4	2·6	55·0
		May	6·1	8·4	2·1	0·9	3·3	14·1	14·2	4·2	53·3
		June	7·0	7·5	2·5	1·8	2·7	15·0	20·4	6·8	63·7
		July	6·0	9·9	2·7	1·1	4·6	10·1	15·9	5·1	55·4
		August	7·5	14·6	4·4	1·2	5·0	11·7	16·7	3·1	64·2
		September	3·2	9·9	5·2	2·7	6·3	22·7	12·2	1·9	64·1
		October	4·0	9·9	6·1	3·3	7·7	25·5	12·2	1·1	69·8
		November	1·1	9·3	8·6	5·8	7·5	17·1	8·5	1·8	59·7
		December	3·0	12·2	7·6	2·3	6·7	15·9	9·6	0·7	58·0
25°–30° S.	30°–35° E.	January	6·4	12·7	5·0	13·9	12·6	3·9	0·65	0·2	55·4
		February	5·6	9·9	8·4	9·6	10·4	4·8	0·7	0·9	50·3
		March	5·9	12·7	4·3	9·5	13·2	10·7	3·9	0·2	60·5
		April	3·6	4·5	6·8	11·8	14·9	8·2	2·3	0·9	52·0
		May	11·5	10·0	3·5	3·9	9·5	8·8	1·3	2·7	51·0
		June	11·7	7·9	1·6	7·8	16·3	7·3	1·3	3·0	56·8
		July	14·3	11·2	1·9	4·5	9·8	5·3	0·8	3·5	51·1
		August	11·3	12·6	3·1	7·6	10·9	7·8	0·7	2·3	56·3
		September	11·1	15·9	3·5	6·5	13·7	9·1	0·9	1·3	62·1
		October	9·5	5·9	5·9	9·7	14·5	6·5	0·5	1·5	53·9
		November	9·3	13·6	6·1	8·7	14·9	7·5	1·7	1·1	63·1
		December	7·9	15·8	5·1	7·7	14·1	8·7	1·1	0·3	60·7

Charts 596, 748a, 2483.

Charts 4301, 5302.

Winds.—*Winds on the coast.*—Owing to the mountainous character of the land the direction of the wind on the coast is generally different from that of the wind in the offing, and effects such as those described in paragraphs (i) to (v) of the standard article on " Local modification of the weather near the coast," *see* page xlvii, are to be expected.

Since there is considerable variation of the directions of the prevalent winds from place to place along the coast, the average percentage frequencies of wind directions in the climatic tables on pages 64-80 are no guide to the prevalent winds at other points on the coast.

Winds off the coast; prevalent directions.—The table on the previous page shows for each month the percentage frequency with which winds of force 4 or more blow irom various directions, taken as a percentage of all winds including calms.

The table on the previous page shows that there is considerable variation during the year in all localities.

Gales off the coast.—Gales are rather frequent south of about Latitude 30° S., especially in winter (June–August). The following table shows for five degree squares the percentage number of winds of Beaufort force 8 or more.

° S.	° E.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
35 to 40	15–20	7	7	4	13	20	15	15	21	16	10	7	10
	20–25	6	7	6	7	15	17	19	13	13	15	9	7
	25–30	5	8	10	17	20	23	19	9	14	12	9	7
30 to 35	15–20	2	5	3	5	8	4	4	7	*	4	4	2
	20–25	4	4	1	4	4	*	4	5	8	3	*	3
	25–30	9	6	12	10	10	16	13	13	10	14	*	5
	30–35	1	3	5	8	10	5	7	4	8	5	5	5
25 to 30	30–35	2	2	2	3	*	5	2	1	2	5	1	3
	35–40	3	*	1	*	4	1	2	*	2	2	*	*

U.S. Hyd. Office.

* Signifies no figure available.

The following table shows the directions from which winds of force 7 or more have been observed to blow most often.

° S.	° E.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
30–35	15–20	SE.	SE.	SE.	SE., W.	NW., W.	NW.	NW., W.	NW., W.	SE.	SE.	SE.	SE.
35–40	20–25	W.	W.	SW.	W.	W.	W.	W.	W.	W.	W.	W.	W.
35–40	25–30	SW.	SW.	W.	W.	W.	W.	W.	W.	W., SW.	W.	W.	W.
30–35	30–35	S.	S., NE.	SW.	SW.	SW.	SW.	SW.	SW., NE.	SW.	S., NE.	SW.	SW.
25–30	30–35	SE.	SSW.	SSW.	SW., SSW.	SW.	SSW.	S.	NNE.	NNE.	SSW.	SSW.	SSW.

South-easters.—Gales from between south and east occur on the south coast, and off that coast, in all seasons, though they are most frequent in spring and summer.

The following remarks on South-easters are taken from " Notes on

Charts 596, 748a, 2483.

Maritime Meteorology" by Commander M. W. Campbell Hepworth, C.B., R.N.R.

"In Table bay, the ordinary indications of a South-easter are well marked—a high barometer, a clear sky, and the cloud cap known as the tablecloth on the summit of Table mountain; but it may not be generally known that during the hardest South-easters, the Blaauwberg and Hottentot Holland ranges are obscured by mist, and that, after the cloth has disappeared, the gale often continues until these mountain ranges are clear. In autumn, during south-easterly gales, the top of Table mountain is often quite clear. Such a gale is called a 'blind South-easter,' but the Blaauwberg and Hottentot Holland ranges are covered in mist 24 hours or more before the breeze springs up, by which sign it may thus be confidently foretold; moreover, the wind does not die away until these mountains are clear." The following remark was made by Captain Toynbee in a report on gales off the Cape of Good Hope. "In Autumn, the South-easters blow at times with great fury over Table mountain and Devil's peak and through the gap between them, driving the white clouds in rolling fleeces like wool over the perpendicular sides of the mountain. On these occasions, vessels not well moored are liable to drag."

South-easterly gales also occur in connection with depressions. These gales are usually accompanied by cloud and sometimes by rain; they are known as "black South-easters," as Table mountain becomes covered with a dark rain cloud. These gales are preceded by northerly winds, whereas the fine weather South-easters follow southerly winds.

South-easters often blow with great strength in Simons bay and False bay, making landing in boats disagreeable and sometimes impracticable. In Simons bay, it is said that should Muizenberg be capped with white cloud, it is generally the precursor of a south-easterly wind, which wind will probably be violent and of long duration if the Hottentot Holland range on the eastern side of False bay is similarly capped; when Simons bay has a misty cloud on its summit, rain may be expected within an hour or two.

It has been remarked that the Hottentot Holland range is the first to cover on the approach of a south-easterly gale, and should Muizenberg not cover, it may not blow home to Simons bay.

Strong easterly and south-easterly winds, sometimes reaching gale force, cause inconvenience in Algoa bay, chiefly in summer; the worst gales are said to occur at the beginning and end of this season. The barometer is usually high before these gales set in, but it is sometimes unsteady and may fall before the wind increases, the horizon being hazy, but the sky being usually clear. "Black South-easters," with rain and thick weather, are said to be most frequent here in October and November; they do not usually last long, but are sometimes violent.

It is said that there is often a change in wind and weather on rounding Cape Agulhas. A strong South-easter, blowing between the Cape of Good Hope and Cape Agulhas, may moderate off the latter cape, while a south-easterly gale, blowing from Cape St. Francis westward, may shift northward off Cape Agulhas.

Westerly gales.—Reference has already been made, under the heading *Pressure* (*see* page 41), to the eastward-moving depressions whose tracks lie mostly at a considerable distance southward of Latitude 40° S. These depressions are closely associated with the westerly gales that are so frequent off the south coast, especially in winter. In summer, the relatively few westerly gales are of short duration, but in winter they may last for several days, may extend over a large area and raise heavy seas. Off the coast between Table bay and Cape St. Francis, the gales are mainly from directions between north-northwest and west.

Near the Cape of Good Hope, the following are said to be prognostics of a north-westerly gale ; a falling barometer with the wind blowing from about north-north-east ; a clear atmosphere ; temperature rising unusually high, usually a day or two before the gale begins ; there is generally cirrus cloud in the north-west, while Lion's Head, and later Table mountain and the high land round about, all become enveloped in cloud.

North-westerly gales have been reported as lasting from 2 to 10 days ; they are usually accompanied by cloudy skies and drizzle, and there is sometimes fog in the vicinity of Cape Agulhas and off the coast northwestward of that Cape. The wind may shift suddenly to west or south-west at the passage of the cold front (*see* standard article on Lows, page xxxiv) and sometimes the passage of the front is marked by a severe squall with thunder and lightning. Hail often accompanies the cold south-west wind. Inshore this south-west wind is sometimes known as a " kloof wind," blowing as it does with particular violence along the valleys which are known as kloofs. These south-west winds are particularly dangerous for boat sailing in Simons bay because of the squalls which come down from the hills.

On the east coast northward of Cape Recife the south-westerly gales are generally the more dangerous, for they often sweep down suddenly from the high land of the interior with violent squalls, and the wind on reaching the coast is very gusty. A north-easterly wind blows while pressure is falling, and this wind often dies away just before the passage of the cold front ; after the first rise of pressure the wind usually shifts to south-west, and increases rapidly in strength. While the north-easterly wind is blowing, the sky is usually clear or clear apart from small patches of cirrus, but sometimes, before the arrival of the cold front, a low bank of cloud appears, usually on the south-western horizon, and soon covers the sky. The south-westerly wind is often accompanied by rain and sometimes by thunder.

North-easters.—On the east coast northward of Cape Recife the north-easterly winds in front of an approaching depression are often strong, and may reach gale force. The wind gradually increases in strength as pressure falls, although it often moderates before the lowest pressure is reached. After the passage of the front, however, the wind may shift to south-west and rapidly increase in strength again. Off the coast of Natal, the indications of a north-easter are said to be a greyish-white haze to the north-eastward and a heavy swell.

Berg winds.—These are hot dry winds from the interior, which are more common from about May to August than at other times of the year ; in its descent from the high uplands the air may reach a withering degree of dryness. The angle at which a berg wind crosses the coast is largely dependent upon local topography.

Land and sea breezes.—These are prominent on most of the coasts.

Charts 4301, 5302.

See section (v) of the standard article on " Local modification of the weather near the coast," page xlvii.

Cloud.—These coasts are less cloudy than are those of south-east England. At Cape Town the average number of clear days outnumbers the number of cloudy days in all seasons, and from December to March are seven times more frequent.

Broadly speaking, from Cape Town to the mouth of the Kosi river, there is a progressive increase of cloudy days and a change in the cloudiest season from winter to summer. At Durban, from September to March, half the days are cloudy.

Monthly averages of the number of clear and cloudy days for several ports are given in the climatic tables, pages 64 to 80.

Rain and hail ; thunderstorms, waterspouts.—At Cape Town the average annual rainfall is slightly less than that of south-east England and more than 80 per cent. of this falls in the 7 months from April to October, but between Cape Agulhas and Cape Recife there is less rain, and no clearly-defined rainy season. At most places northward of Cape Recife the average annual fall is greater than in south-east England. It increases with decreasing latitude. On the coast of Natal the general average is 45 to 50 inches, i.e. about twice that of south-east England and two-thirds of this falls in the 6 months October to March.

The figures quoted above are of little use for estimating the rain that may be expected in a particular year, since the variations from year to year and from place to place are large.

Thunderstorms are not very frequent either on the coast, or at sea. They are generally violent and may result in downpours yielding several inches of rain. Such storms account for much of the summer rainfall, especially in normally dry places.

Hail, which is infrequent, falls chiefly at cold fronts and in thunderstorms. The hailstones are sometimes large enough to damage ships and harbour installations, and have been known to cause loss of life.

Waterspouts may be encountered, usually in thundery weather and especially at cold fronts.

Fog and visibility.—Off the southern and eastern coasts of the Union fog, in general, is uncommon. In all seasons, it has on an average been recorded at about one observation out of every hundred, except in the region westward of Cape Agulhas. In that region it is much more frequent in April and May, being recorded about once out of every ten observations ; during the rest of the year the frequency is about the same there as in other coastal regions. It has been reported that the fogs westward of Cape Agulhas are generally associated either with calms or light winds, or with north-westerly winds ; the north-westerly winds may be of any strength up to Beaufort force 6. The fogs with north-westerly winds are sometimes very dense.

The average number of days per month with fog is shown for several places on the coast in climatic tables on pages 64 to 80.

Both on the coast and at sea, visibility is sometimes bad during heavy rain, and is often very poor in association with strong winds or gales from any easterly point.

Air temperature on the coast.—Data for a number of places on the coast are given in climatic tables on pages 64 to 80.

Most of the coast has a high average temperature but the coast

Charts 596, 748a, 2483.

westward of Cape Agulhas is relatively cool. At Cape Agulhas, in the coolest month (July) average temperature is about the same as that for south-east England in May. In the warmest months—January and February—temperature at Cape Agulhas usually approaches 80° F. during the warmest part of the day and falls only to about 60° on most nights; these figures are several degrees higher than the corresponding average figures for south-east England at the height of summer. Between Cape Agulhas and East London the general level of temperature is two or three degrees higher than on the coast westward of Cape Agulhas.

Northward of East London there is a gradual increase of temperature to the tropical level of the Natal coast, but the summer heat there is slightly modified by the cloud and rain of that season. From December to March temperature normally rises to about 80° during the day and falls to about 68° at night; in most years it very seldom falls much below 60° or rises to 90° at any time during this season. On practically all parts of the coast, however, temperature has on occasion risen well above 100°, but in 20 years it has not exceeded 96° at Cape Agulhas lighthouse. Extreme heat seldom lasts for more than a day or two, and is usually followed by a sudden fall of temperature to a level below that of the normal for the time of year, the change often being accompanied by a thunderstorm.

Temperature on rare occasions in winter falls slightly below the freezing point on the south coast; it has been known to fall to 28° at Cape Town.

Sea surface temperature.—Mean sea surface temperatures for the four months February, May, August and November are shown in figures 8, 9, 10 and 11.

The Benguela current (*see* Currents, page 16) causes the surface water off the west coast of South Africa to be considerably cooler than that off the south and east coasts, which are washed by the warm Agulhas current flowing south-westward and westward.

Off the coast between Cape Agulhas and the Cape of Good Hope occasional large variations of sea temperature from the average for the time of year occur, and also very rapid changes horizontally. These are due to the incursion of cool water from the Southern Ocean current and are most frequent in April and May. In False bay, which is usually reached by the warm current, the water may be 10° F. warmer than in Table bay.

Humidity.—Relative humidity is not often high on these coasts, but at sunrise nearly everywhere it averages about 90 per cent. during a large part of the year, and a saturated atmosphere is not uncommon in autumn on the coast westward of Cape Agulhas and to seaward.

Very low humidities are recorded at times with berg winds.

Average relative humidity for various hours of the morning and afternoon are given for several ports in climatic tables on pages 64 to 80.

Mirage.—Abnormal refraction, which may be sufficient to cause mirage, occurs at times near the coast, especially westward of Cape Agulhas. This refraction is likely to cause errors in taking sights (*see* standard article on Mirage, page xxxi).

Coastal weather of Moçambique.—Summary.—Two monsoons affect this part of the coast, the northerly monsoon from November

Charts 4301, 5302.

to February and the southerly monsoon from April to September. Although there are not many gales, a cyclone from the Indian Ocean enters the Moçambique channel from the north, between November and May, once in about 5 or 10 years. There is virtually no fog at sea.

Pressure.—Average pressure for each month is given for three ports in climatic tables on pages 64 to 80. It is highest in July and lowest in January, and decreases slightly northward throughout the year.

Anticyclones, moving for the most part in some easterly direction, with intervening secondary troughs of low pressure connected with the travelling depressions of the Southern Ocean, influence the weather southward of Beira, and occasionally even so far north as Cape Delgado.

There is a regular diurnal variation of pressure, which is only occasionally masked by changes due to the travelling pressure systems. The mean pressure being highest at about 1000 and 2200 local time and lowest at about 0400 and 1600 local time. The daily range of this variation on the coast is estimated to be 2 or 3 mb. southward of Latitude 20° S. and 3 or 4 mb. northward of Latitude 20° S.

Corrections in millibars and tenths of a millibar to be applied for diurnal variation at sea between the parallels of 10° S. and 20° S. are as follows :—

Local time	00	01	02	03	04	05	06	07	08	09	10	11
	− 0·4	0·0	+ 0·4	+ 0·7	+ 0·7	+ 0·4	0·0	− 0·5	− 1·0	− 1·2	− 1·2	− 0·9
Local time	12	13	14	15	16	17	18	19	20	21	22	23
	− 0·3	+ 0·3	+ 0·9	+ 1·3	+ 1·4	+ 1·2	+ 0·8	+ 0·2	− 0·3	− 0·7	− 0·9	− 0·7

Caution.—When entering a barometric pressure in the log, or when including it in a radio weather report, the correction for diurnal variation *must not be applied.* For conversion of pressures in millibars to their equivalents in inches, *see* diagram on page 44.

Winds.—*Winds on the coast.*—The direction of the wind on the coast is often different from that of the wind in the offing, and the effects described in paragraphs (i) to (v) of the standard article on " Local modification of the weather near the coast," page xlvii, are to be expected. This is especially marked northward of Moçambique, owing to the hilly or mountainous character of the land at no great distance from the coast ; southward of Moçambique much of the hinterland is low-lying, and the principal differences between winds on the coast and winds at sea arise from the land and sea breezes described in paragraph (v) of the standard article.

In winter hot dry winds from north-north-westward are common on the coast southward of about Cape Correntes.

Winds off the coast ; prevalent directions.—The following table shows for each month the percentage frequency with which winds of force 4 or more blow from various directions, taken as a percentage of all winds including calms. Together with those for the square 25–30° S., 30°–35° E. (*see* page 44) they give an indication of the prevalent winds.

Many of the stronger winds from south and south-east, and from north and north-east, especially those of winter, are associated with the eastward passage of secondary troughs. The changes of pressure and of wind and weather with the passage of a secondary trough, have been outlined in those parts of the description of the weather of the Union of South Africa that relate to the coast between Cape Recife

Charts 596, 597, 748a, 748b, 2483.

Charts 4301, 5302.

PORTUGUESE EAST AFRICA OR MOÇAMBIQUE

° S.	° E.		N.	NE.	E.	SE.	S.	SW.	W.	NW.	Total %
20–25	35–40	January	1·9	3·6	8·6	23·3	10·9	2·1	2·1	1·6	54·1
		February	1·1	2·8	9·3	22·1	10·0	2·7	0·7	0·6	49·3
		March	0·7	1·2	7·4	22·7	16·3	1·5	0·1	0·4	50·3
		April	0	4·2	4·3	27·5	22·7	1·6	0	0	60·3
		May	4·3	2·1	6·9	17·7	8·8	0	0	0	39·8
		June	2·7	1·4	4·1	17·4	10·5	2·9	2·5	1·3	42·8
		July	5·2	3·2	2·4	19·4	13·9	3·0	0·6	0	47·7
		August	4·8	3·9	5·1	18·5	8·1	0·5	0·4	0·8	42·1
		September	5·7	4·7	8·9	13·1	9·1	0·3	0	0	41·8
		October	2·9	7·0	11·2	17·5	3·9	0·4	0	0	42·9
		November	3·2	12·7	5·7	11·7	7·0	1·7	0·2	0·2	42·4
		December	4·7	10·9	4·7	13·3	5·7	0·8	0·3	0·3	40·7
10–15	40–45	January	8·8	3·4	1·2	0·5	1·5	1·3	1·2	8·2	26·1
		February	11·2	2·1	1·1	0·8	0·9	0·4	1·5	3·8	21·8
		March	4·5	0·9	1·1	1·7	2·3	1·4	1·2	3·1	16·2
		April	0·3	0·9	3·7	6·9	14·7	3·9	0·3	0	30·7
		May	0·1	0·1	0·7	7·5	17·3	6·4	0	0	32·1
		June	0·1	0·3	1·3	10·5	26·1	8·8	0·3	0	47·4
		July	0·6	0·6	2·6	10·5	30·1	6·7	1·5	0	52·6
		August	0	0·1	4·1	8·1	12·6	3·1	0	0	28·0
		September	0	0·5	2·1	3·9	5·5	1·3	0	0	13·3
		October	1·9	2·9	1·1	1·7	3·1	3·1	0·2	0·1	14·1
		November	3·3	4·3	2·4	1·7	1·5	0·7	0·2	0·1	14·2
		December	5·6	1·2	1·1	0·5	1·7	0·5	0	1·3	11·9

and Ponta do Ouro (*see* latter part of *Westerly gales*, and *North-easters*, page 47). These secondary troughs are not normally associated with such strong winds in the Moçambique channel as they are off East London.

The figures in the table show that off the northern part of the coast there are two seasons. These may be termed the northerly monsoon and the southerly monsoon, and are separated by transitional periods of variable and nearly always light wind.

The northerly monsoon season is from about the beginning of November to about the end of February. In November and December the wind is mainly light and from between north and east. In January there is an increase in the proportion of winds of force 4 or more, but they are not very numerous; they blow mainly from between north-west and north-east. In February they are mainly from north and north-north-west, light winds becoming increasingly frequent as the month progresses, and in March direction is very variable, and almost all winds are light.

The southerly monsoon season from April to September has a predominance of winds from between south-east and south-south-west; it is steadier in direction and stronger than the northerly monsoon, with many occasions when the wind blows with Beaufort force 5 or more, and on very exceptional occasions with force 7.

The two transitional periods of light variable wind are roughly the months of March and October. In March wind may be from any direction, but in October there is a predominance of southerly winds if the southerly monsoon season is longer than usual, and of north-easterly winds if the northerly monsoon is early.

Gales.—There have been very few occasions at sea on which force 8 or more has been recorded and of these most have been southward of Latitude 20° S. On an average the wind reaches or exceeds force 7

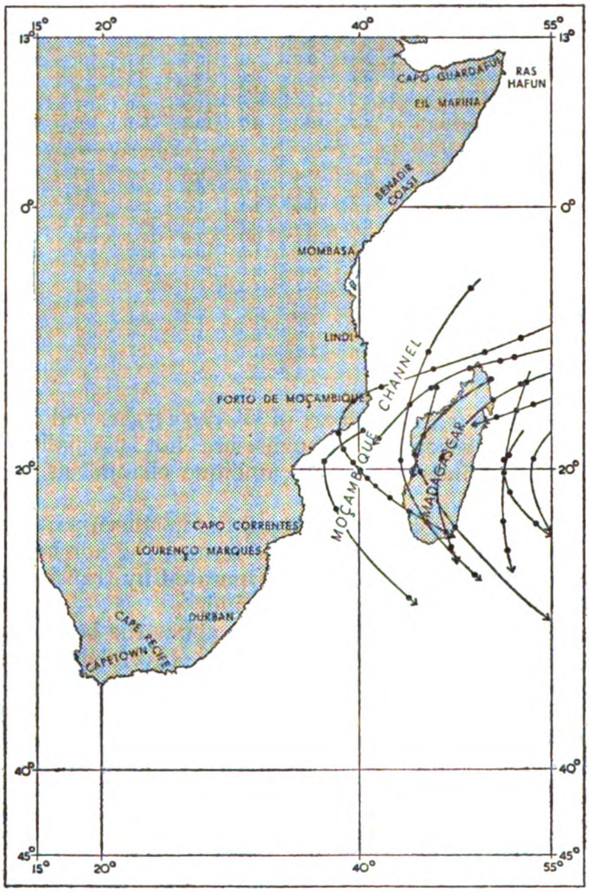
Charts 596, 597, 748a, 748b, 2483.

Charts 4301, 5302.

about eight times in a year off most of the coast, but less often northward of Latitude 15° S. Such wind strengths occur more frequently with southerly winds than with northerly or north-easterly winds.

Cyclones.—A description of these storms is given in the standard article on tropical revolving storms, page xxxvi, and typical tracks are shown in Figure 7.

Figure 7.



Typical Cyclone Tracks.
December to January.

Very few cyclones of the Indian Ocean cross the mountains of Madagascar, but once in about five or ten years, on an average, one enters the Moçambique channel and affects some part of the coast between Lourenço Marques and Mombasa, generally between November and May. The direction of movement in the northern half of the Moçambique channel and northward of that channel is nearly always southward or south-westward, and some of the storms recurve in the central or southern part of the channel and move away in a south-easterly direction.

Charts 596, 597, 748a, 748b, 2483.

Charts 4301, 5302.

Although many more cyclones would reach the southern part of the Moçambique channel but for the partial protection afforded by Madagascar, the cyclones of this region may be as violent as any that occur over the open ocean. The storm in which the s.s. *City of Delhi* was involved for several days late in March 1910 is a notable example.

Cloud.—There is a good deal of cloud in summer on the northern part of this coast, but not so much at sea. In the northern part of the Moçambique channel the cloudiest season is the late summer and early autumn. Averages of the number of clear and cloudy days for three ports are given in climatic tables on pages 64–80. They show that in the vicinity of Moçambique, which is in the cloudiest region, it is only in January that half the days of the month are cloudy, and that clear days are frequent even in the north in winter and very frequent at Lourenço Marques.

Rain.—The annual rainfall on these coasts is fairly heavy, ranging in different years and places from about 30 to 60 inches. It is much heavier in summer, and substantially lighter in winter, than during the corresponding seasons in south-east England.

The central part of the coast, between Beira and Moçambique, has a considerable proportion of the yearly fall during the five months from November to March. Long periods of continuous heavy rain in the vicinity of Beira and Quelimane during this season often result in flooding as the rivers overflow their banks, and sometimes there is widespread damage and interruption of communications. In the relatively dry season, which is most marked in late winter and early spring, rain usually falls on several days per month.

Thunderstorms generally occur on several days in each of the wettest months, but seldom in winter, and are very rarely, if ever, accompanied by hail, even in the extreme south.

Waterspouts are known to occur occasionally in the southern part of the Moçambique channel, and are to be expected on rare occasions in very disturbed weather in the north.

Fog and visibility.—At sea southward of about Latitude 20° S., fog has been observed on rare occasions during the eight months April to November usually in September and October. Visibility less than 5 miles has, however, been observed, over the region generally, at about one observation out of ten from August to October.

On the coast fog has been recorded fairly often from May to August in the south and from June to September in the north, but seldom during the height of the rainy season, from November to March. It is, however, probable that many fogs develop over the low-lying swampy regions during the night, but disperse near sunrise and are unrecorded.

Air temperature on the coast.—Air temperature is higher in the winter months, June to August, than it is in south-east England in an average English summer. At Lourenço Marques in the warmest months, December to February, the average temperature is about 77° F. : it increases northward to about 80° at Porto de Moçambique. During June and July temperature generally rises above 85° during the day and in the north often to about 95°, falling to between 55° and 65° at night.

The weather of the relatively cool months, June to August, is for

Charts 596, 597, 748a, 748b, 2483.

Charts 4301, 5302.

the most part pleasant, but hot dry winds sometimes blow down from the uplands, especially between Cape Correntes and Ponta do Ouro.

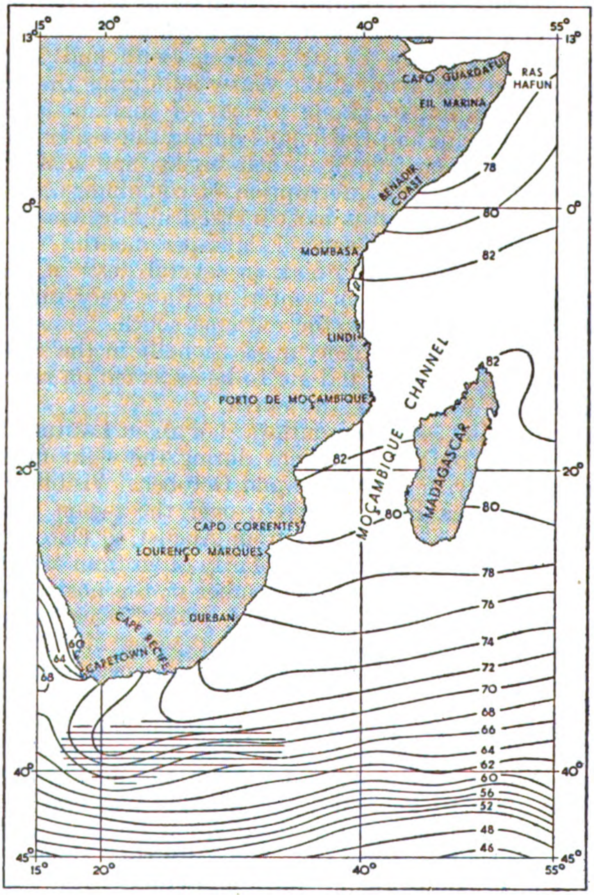
Sea temperature.—The warm Moçambique current keeps the average temperature of the sea surface above 70° F. even in August, which is the month with lowest sea temperature. The water is warmest in February with an average of over 80° (*see* Figures 8 and 10).

Humidity.—Average humidity is rather high during most of the year, and the nights are very oppressive during the rainy season, partly because of the high humidity. Very low humidities are sometimes recorded, especially in the south, with hot winds that blow down from the uplands, generally from about north-north-west.

Coastal weather of Tanganyika and Kenya.—Summary.—Two monsoons affect this part of the coast, the north-easterly monsoon

Charts 596, 597, 748a, 748b, 2483.

Figure 8.



Mean Sea Temperatures.
February.

Areas in which the mean sea temperature exceeds the mean air temperature by 3° F. or more are indicated by horizontal shading, and those in which the

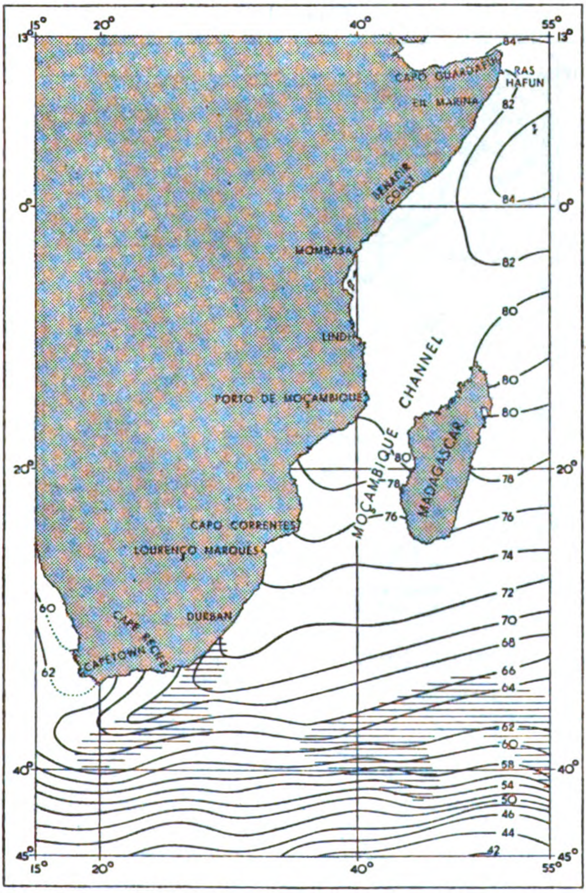
Charts 4301, 5302.

from December to February and the southerly to south-easterly monsoon from April to September. The latter monsoon is often fresh or strong in July and August, but there are few gales. There is virtually no fog at sea.

Pressure.—Average pressure over coastal waters is highest in July and August when it is about 1017 mb. in Latitude 5° S., and lowest in February when it is between 1009 and 1010 mb. in Latitude 10° S. Average monthly pressures for some ports are given in climatic tables on pages 64 to 80, but since the periods on which the averages are based are not very long the averages may be in error by one or two millibars.

Charts 597, 748b, 2483.

Figure 9.



Mean Sea Temperatures.
May.

mean air temperature exceeds the mean sea temperature by 3° F. or more, by vertical shading.

The dotted lines are drawn where the data is insufficient for confidence to be placed in the representation.

Charts 4301, 5302.

There is a regular diurnal variation of pressure; on an average, pressure is highest at about 1000 and 2200 local time, and lowest at about 0400 and 1600 local time, with a range estimated to be 3 or 4 millibars. This variation is nearly always perceptible except in very disturbed weather.

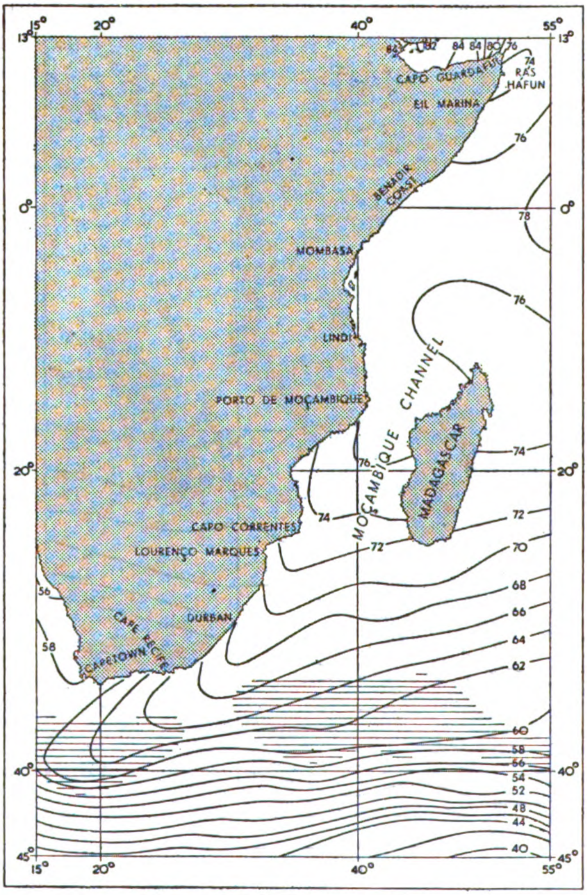
Corrections in millibars and tenths of a millibar to be applied for diurnal variation at sea between latitudes 0° and 10° S. are as follows :—

Local time	00	01	02	03	04	05	06	07	08	09	10	11
	− 0·7	− 0·2	+ 0·2	+ 0·6	+ 0·7	+ 0·5	+ 0·1	− 0·5	− 1·0	− 1·3	− 1·3	− 1·1
Local time	12	13	14	15	16	17	18	19	20	21	22	23
	− 0·5	+ 0·2	+ 0·9	+ 1·4	+ 1·6	+ 1·5	+ 1·1	+ 0·5	− 0·1	− 0·7	− 0·9	− 0·9

Caution.—When entering a barometric pressure in the log, or when including it in a radio weather report, the correction for diurnal varia-

Charts 596, 597, 748a, 748b, 2483.

Figure 10.



Mean Sea Temperatures.
August.

Areas in which the mean sea temperature exceeds the mean air temperature by 3° F. or more are indicated by horizontal shading, and those in which the

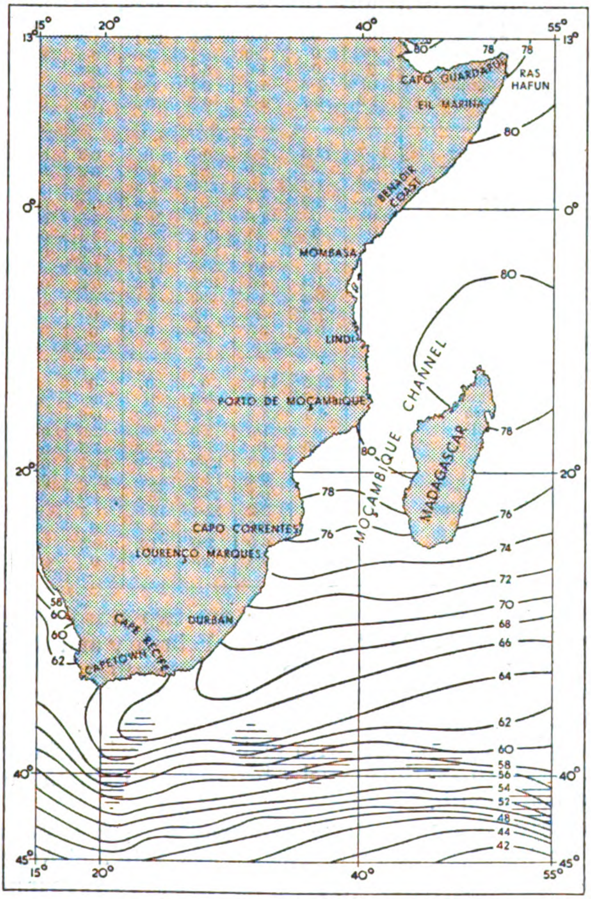
Charts 4301, 5302.

tion *must not be applied.* For conversion of pressures in millibars to their equivalents in inches, *see* diagram on page **44.**

Winds.—*Winds on the coast.*—The effects described in paragraphs (i) to (v) of the standard article on "Local modification of the weather near the coast," page xlvii, are so much in evidence that the wind on the coast is seldom the same in strength and direction as the wind in the offing. For example, the climatic table for Lindi (Latitude 10° 00′ S.) on page **74** shows that at 0830 local time two-thirds of all winds are from about south-west in May and June, in which months the southerly to south-easterly monsoon prevails at sea. This preponderance of south-westerly winds is clearly due mainly to the SW. to NE. trend of the deep valley down which the Lindi river flows.

Charts 596, 597, 748a, 748b, 2483.

Figure 11.



Mean Sea Temperatures.
November.

mean air temperature exceeds the mean sea temperature by 3° F. or more, by vertical shading.

Charts 4301, 5302.

At Lindi, moreover, at 1430 local time in January and February two-thirds of all winds are from about north-east. The afternoon sea breezes, the north-east monsoon and local topography here combine to produce a wind stronger and more steady in direction than the wind in the offing.

Winds off the coast; prevalent directions.—The following table shows for each month the percentage frequency with which winds of force 4 or more blow from various directions taken as a percentage of all winds including calms.

TANGANYIKA AND KENYA

° S.	° E.		N.	NE.	E.	SE.	S.	SW.	W.	NW.	Total %
About 4–10	Coast to 40	January	4·0	13·5	3·3	0·4	0	0	0	1·2	22·4
		February	5·9	9·9	3·4	0	0·3	0·3	0·7	2·1	22·6
		March	2·2	3·4	1·0	0·8	0·6	1·0	0	0·2	9·2
		April	0	0	0·7	4·9	11·9	3·1	0·5	0	21·1
		May	0	0	0	6·1	15·6	5·7	1·0	0	28·4
		June	0	0	0·6	8·6	24·6	10·7	0·2	0	44·7
		July	0	0	1·1	7·3	13·5	4·9	0	0	26·8
		August	0	0	0·9	8·5	10·1	1·9	0	0	21·4
		September	0	0	2·0	8·1	2·5	0·5	0·3	0	13·4
		October	0	0	1·0	3·7	0·3	0·3	0	0	5·3
		November	0	1·9	1·7	2·1	0·3	0·5	0	0	6·5
		December	1·6	6·7	1·9	0·3	0·5	0	0·4	1·1	12·5
5–10	40–45	January	10·7	13·3	2·5	0·7	0	0·5	0·6	4·9	33·2
		February	9·1	6·2	2·9	1·5	0·2	0·2	0·3	2·2	22·7
		March	2·8	1·7	2·3	2·7	1·3	0·5	0	0·3	10·6
		April	0	1·9	2·4	11·1	8·5	0·8	0·2	0	24·9
		May	0	0	1·8	14·9	21·2	5·5	0·4	0	43·8
		June	0	0	2·1	19·2	36·2	8·4	0·3	0	66·2
		July	0	0	1·4	15·5	24·0	3·3	0·6	0	44·8
		August	0	0	4·1	20·3	13·7	1·5	0	0	39·6
		September	0	1·3	4·7	12·2	7·2	0·2	0·1	0	25·7
		October	0	0·3	4·5	8·9	2·1	0	0	0	15·8
		November	0·3	1·3	4·0	6·5	2·2	0	0	0	14·3
		December	6·9	6·8	3·3	0·5	0	0	0	0·9	18·4
0–5	40–45	January	0	24·5	11·3	0	0	0	0	0	35·8
		February	0	14·7	8·4	0·9	0	0	0	0	24·0
		March	0	1·1	4·9	3·7	0·9	0·9	0	0	11·5
		April	0·3	0	1·3	2·9	6·0	2·9	0·3	0·3	14·0
		May	0	0·6	0	7·8	33·3	7·5	0·3	0·3	49·8
		June	0	0	0·3	22·9	45·9	11·5	0·6	0	81·2
		July	0	0	0·4	12·9	44·5	12·5	0·4	0	70·7
		August	0	0	0·7	29·5	29·7	4·0	0	0	63·9
		September	0	0	2·3	12·1	19·9	1·5	0	0	35·8
		October	0	0	2·6	9·1	3·3	0	0	0	15·0
		November	0	4·1	6·0	2·9	1·3	0·3	0	0	14·6
		December	0·3	11·1	9·4	0·3	0	0	0	0	21·1

It is clear from the table that there are two seasonal winds, the north-easterly monsoon from December to February and the southerly to south-easterly monsoon from April to September.

The north-easterly monsoon is steadier in direction, and stronger, northward of Latitude 5° S., than it is further south. In the south it is often replaced by periods with mainly light winds from between south and east two or three weeks before the beginning of March, the transitional month.

The southerly to south-easterly monsoon in April is mostly light. From May to June the wind strengthens. In July and August winds of force 7 or even 8 from south-south-east or south-east occur northward of Latitude 5° S., although only rarely. In September winds of similar strength from between east and south occur on rare occasions

Charts 597, 748b, 2483.

southward of Latitude 5° S., the strength of this monsoon having lessened considerably further north.

October and November are transitional months, with many light winds from directions between south and north-east.

Gales.—Mention has been made above of the infrequency of winds of force 7 or more off the coast and there are few such winds on the coast.

Cyclones.—It is only very rarely, if at all, that a cyclone occurs so far north of the Moçambique channel as to affect the coastal waters of Tanganyika or Kenya. Should one do so it would be preceded by winds from south or south-west.

Cloud.—Broadly speaking there are rather more clear days than cloudy days on the coast, except where there are mountains in the vicinity.

Rain.—The annual rainfall is fairly heavy, being mostly between 30 and 60 inches. Between about latitudes 10° S and 7° S. the wettest season is from December to April and the relatively dry season from June to October. Further north, between about latitudes 7° S. and 4° S. the wettest season is April to May, with a secondary wet season in November; the relatively dry season between latitudes 7° S. and 5° S. is from July to September or October, and between latitudes 5° S. and 4° S. from January to February. It is probable that rainfall decreases northward of Mombasa.

On most of the coast there are one or two thunderstorms per month between November and April, but storms are more frequent where mountain ranges are not far from the coast.

Waterspouts have not often been recorded off this coast.

Fog and visibility.—Fog is extremely rare at sea, but probably develops occasionally at night in the low-lying swampy regions near the mouths of the rivers, and disperses near sunrise. At sea, where visibility is normally good, visibility of less than 5 miles has been observed at about one observation out of twenty in December and January, and also from about July to October.

Air temperature on the coast.—Average monthly temperatures on the coast range from about 75° F. to 83° F., they are nearly everywhere lowest in July and August, and highest in January and February. It is not often that temperature rises much above 90°. Conditions can be very unpleasant when there is little wind, especially in rainy weather and when the nights are cloudy.

Average values of the daily maximum and minimum temperatures for each month are given for several land stations in climatic tables, pages 64 to 80.

Sea temperature.—The average temperature of the sea surface is over 80° F. during most of the year but falls to about 77° from July to September, see Figures 9 to 11.

Humidity.—Average values of relative humidity for six land stations are given in climatic tables on pages 64 to 80.

Southward of Latitude 6° S., relative humidity in the afternoon is considerably lower from about May to August than it is at the same time of day in summer and with offshore winds sometimes falls to 40 per cent or lower in winter.

Northward of Latitude 6° S., the seasonal variation becomes progressively smaller with decreasing latitude, and the average humidity

Charts 4301, 5302.

increases slightly, but there may be considerable difference between the humidity of the early morning and that of the afternoon of the same day.

Coastal weather of Somalia.—Summary.—Two monsoons affect this part of the coast, the north-easterly monsoon from about December to March and the south-westerly monsoon from about May to September. In the north the two monsoons are very steady. The south-westerly monsoon is much the stronger and the frequency of gales (force 8 or more) northward of about Latitude 8° N. reaches 10 a month from June to August; in the same region and months visibility of less than 5 miles is frequent, despite the fact that on all this coast visibility is generally good.

Pressure.—The annual variation of pressure off the coast near the southern and northern boundaries of the area under consideration is shown by the following approximate averages of pressure.

Average pressure in millibars (initial 1000 *omitted)*

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
2° S.	11	10·5	12	11	12	14·5	16·5	15	14	13	11·5	11·5
10° N.	14	13	12	10	8·5	6·5	5	8	9	11·5	13	14

The figures show that pressure is slightly higher in the extreme south in June and July than in any other month, and that in Latitude 10° N. the mean is 1005 mb. in July, and 1014 mb. in December and January. The variation in the north is associated with the large yearly variation over Asia.

There is a diurnal variation of pressure similar to that described under Pressure in the section dealing with Tanganyika and Kenya. For conversion of pressures in millibars to their equivalents in inches, *see* diagram on page 44.

Winds.—*Winds on the coast.*—Paragraphs (i) to (v) of the standard article on "Local modification of the weather near the coast," page xlvii, apply here. The south-westerly and north-easterly monsoons, which are more clearly defined in the north than in the south, are described below under *Winds off the coast.* During the north-easterly monsoon it is often calm in the latter half of the night but a northerly breeze usually begins at about sunrise; this wind slowly gains strength and veers towards east, finally backing and moderating late in the afternoon.

During the south-west monsoon, it often happens that a wind from south or south-south-west blows in the morning, and backs to about south-south-east in the afternoon; it is strongest during the afternoon and during the latter part of the night there are only light breezes.

Shipping operations at the anchorages off the coast are often hampered; in Baía del Negro (*Lat. 7° 50′ N., Long. 50° E.*), during the north-east monsoon, local craft frequently find difficulty in surmounting the breakers. At Eil Marina (Bed Eil) loading and unloading is impossible with a strong south-west monsoon. At Bander Beila (Bandar Beila), cargo work may be seriously hampered during the north-east monsoon; but with a moderate monsoon it can be

Charts 597, 748b, 2483.

carried out by means of flat-bottomed canoes, known as *beden*. In Baía Sud di Hafun, the south-west monsoon often blows strongly and causes rough seas.

Winds off the coast; prevalent directions.—The last part of the table on page 58 shows for each month the percentage frequency with which winds of force 4 or more blow from various directions, taken as a percentage of all winds including calms, in a square which includes the part of Somaliland south of the equator. From about 2° S. to about Latitude 5° N. the south-westerly monsoon normally begins in April and is then mainly light. It is well established, even in the north, from May to September. In July and August all winds northward of about Latitude 5° N. are from between south and west. October and November form a transitional period in which there are sometimes winds from between south and west; these winds are seldom strong.

A weak north-easterly monsoon sometimes blows in October, but more frequently in November; this monsoon is, however, steadiest from December to March, and northward of about Latitude 5° N. there are hardly any winds other than those from between north and east in those months. In April north-easterly winds decrease rapidly in frequency.

Gales.—Northward of about Latitude 8° N., between Longitudes 50° E. and 55° E., from June to August, winds of force 7 or more have been recorded at about four observations out of ten. On more than a third of these occasions the wind was of force 8 or more, giving a gale frequency (force 8 during some part of the 24 hours) of approximately 10 days a month; on nearly all these occasions the wind was from between south and south-west. Between the same longitudes the gale frequency in these three months decreases rapidly southward of Latitude 8° N. and there are very few gales southward of Latitude 3° N.

In May and September there is little trace of the very stormy area; force 7 has been recorded in the square 5°–10° N., 50°–55° E. at one observation out of about 20 in these months, but force 8 very seldom.

During the north-easterly monsoon there are very few gales, although winds of force 5 or 6 are common.

Cyclones.—Despite the high gale frequency northward of Latitude 8° N., between Longitudes 50° and 55° E., described above, there do not appear to be any recorded instances in recent years of the centre of a cyclone reaching any part of this area. In November 1920 a cyclone, moving westward in about Latitude 8° N., was not traced beyond about Longitude 60° E. It appears likely that, should a storm centre be encountered, it would probably be in May or between October and December, and would be travelling westward or west-north-westward. The chance of such an encounter appears, however, to be very small.

Cloud.—There are few cloudy days. From June to August there are about 8 cloudy days per month.

Rain.—The rainfall is small, and on the Benadir coast (approximately 0°–3° N.) is virtually confined to the period April to December. The wettest months on that coast are generally April to July, but in some years October or November. The average yearly fall at Mogadiscio is 19 inches, but there is great variation from year to year.

Charts 4301, 5302.

Northward of Latitude 3° N. few observations are available, but it is probable that falls are lighter and long droughts common.

Thunderstorms may occur during any of the months in which there is rain.

Waterspouts have not often been recorded off this coast.

Fog and visibility.—At sea there is virtually no fog, but visibility is often less than 5 miles, especially northward of about Latitude 8° N. where, from June to August, this low visibility has been observed at about one observation out of every three. It is probable that this is due to desert dust carried to sea by the strong offshore winds.

Air temperature.—The average air temperature on the coast is between 80° F. and 83° F. in most months; at Mogadiscio, however, it is slightly below 80° in July and August. Off the coast average temperature is generally as high as on the coast, but in the vicinity of Ras Hafun, from July to September, it is only about 76°.

Sea temperature.—The average temperature of the sea surface for February, May, August and November is shown in Figures 8 to 11.

It is only from March to May that the sea surface temperature off the whole coast is over 80° F. With increasing strength of the south-west monsoon in June, cool water rises to the surface near the coast, and there is a general fall of sea temperature in coastal waters. This is most marked near Ras Hafun, where by August (*see* Figure 10) mean temperature has fallen to about 74°; it is then about 77° near the equator.

From June to October in the vicinity of Ras Hafun, sea temperature is very variable not only geographically but also between different parts of one month, and from year to year; it may be 6° or even 7° above or below the seasonal average. From December to February, when the north-east monsoon is most steady, on the other hand, it is seldom more than 2° above or below the seasonal normal.

Humidity.—On the Benadir coast relative humidity is high, averaging about 80 per cent.; it is slightly higher in the wettest months than in those without rain. There is probably a slow decrease progressively northward of Latitude 3° N. Northward of about Latitude 8° N. humidity is sometimes extremely low when the wind blows down to the coast from the mountains.

Climatic tables.—The tables that follow give statistics for several land stations. The figures given are averages, percentage frequencies of extremes, as stated; it must be realised that these values refer to the actual positions in which the weather has been observed, and *not* necessarily to the open sea or to the approaches to ports in the vicinity. The tables should therefore be consulted with discretion, since all the elements are affected, some a great deal, by local conditions. The following notes indicate ways in which conditions over the open sea may differ from those at the nearest reporting land station.

(1) Temperature at sea is less variable than over the land; for example, the nights are generally warmer at sea and the days cooler, than over the land.

(2) Rainfall at most stations in this area is affected by mountain ranges, whose influence generally decreases with increasing distance from the land.

(3) The frequency of cloudy days on land often differs widely from the frequency a few miles out at sea, and similarly for clear days,

Charts 596, 597, 748a, 748b, 2483.

Charts 4301, 5302.

(4) Wind speed is generally greater at sea than on land, and there may be several times as many gales at sea than at the nearest shore station, if the shore station is sheltered in those directions from which most of the gales blow at sea. Such a difference would not exist if the shore station were in an open position on a headland or low lying island devoid of shelter. Wind direction may also be greatly affected (*see* " Local modification of the weather near the coast," page xlvii).

(5) The open sea is rarely affected by fogs which form on land during the night when the sky is clear and the wind is light. In the area covered by this volume, however, such night fogs sometimes extend some miles seaward, especially those which form northward of Durban.

Charts 596, 597, 748a, 748b, 2483.

PLACE—CAPE TOWN (WINGFIELD AIRPORT). LAT. 33° 54′ S., LONG. 18° 32′ E. Height above Mean Sea Level, 55 feet.
Climatic Table compiled from 10 to 17 Years' Observations, 1932 to 1950.

MONTH	PRESSURE at M.S.L.	AIR TEMPERATURE Mean of				Relative humidity		SKY ¶ No. of days		RAIN		WIND DIRECTION																		Mean wind speed		No. of days with gale	No. of days with visibility less than ⅝ n. mile
												0730									1330												
												Percentage of observations from									Percentage of observations from												
	Mean	Daily max.	Daily min.	Highest in each month	Lowest in each month	0600	1400	Clear: < 2 oktas	Cloudy: > 6 oktas	Average fall	No. of days with 0·04 in. or more	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	0730	1330		
	mb.	° F.	° F.	° F.	° F.	%	%			in.																				knots			
January	1014	78	60	91	49	86	57	14	1	0·6	3	6	0	0	10	48	11	3	10	12	2	0	0	6	54	10	11	17	0	9	14	—	2
February	1014	79	60	93	50	87	57	13	2	0·3	2	7	0	1	11	43	10	2	8	18	1	0	0	8	51	9	13	16	2	8	14	—	2
March	1015	77	58	93	46	90	60	12	2	0·7	3	8	1	1	8	36	9	3	10	24	1	0	0	9	44	9	17	19	1	7	12	—	4
April	1017	72	53	90	42	91	63	10	4	1·7	6	15	1	1	9	22	6	2	10	34	3	0	0	8	28	7	22	30	2	5	10	—	5
May	1019	67	49	84	37	93	67	7	7	3·1	9	22	3	1	9	13	5	3	8	36	8	2	0	5	19	6	21	31	8	5	9	—	6
June	1021	65	46	80	34	92	66	8	6	3·2	9	23	4	1	8	12	3	3	11	35	11	3	0	6	16	5	15	30	14	5	8	—	4
July	1022	63	45	77	34	92	69	9	8	3·4	10	24	6	2	10	13	5	3	9	28	12	2	0	5	19	7	13	34	8	6	9	—	3
August	1021	64	46	80	35	92	67	8	6	2·5	9	23	5	1	9	19	3	3	8	29	11	1	0	5	25	5	15	32	6	6	10	—	3
September	1020	65	49	83	37	91	65	7	7	1·8	7	20	2	1	11	24	6	3	11	22	5	0	0	6	32	9	17	29	2	7	11	—	1
October	1018	70	52	84	40	88	61	8	4	1·1	5	14	2	1	11	33	11	3	10	15	3	0	0	9	34	13	19	21	1	8	12	—	1
November	1016	73	55	88	45	87	59	9	4	0·7	3	9	1	1	14	41	10	3	11	10	1	0	0	10	46	12	13	18	0	9	13	—	2
December	1015	76	58	90	47	86	57	10	2	0·5	3	7	1	0	11	45	10	4	12	10	1	0	0	8	52	10	13	16	0	9	14	—	1
Means	1018	71	53	—	—	90	62	—	—	—	—	15	2	1	10	29	7	8	10	23	5	1	0	7	35	8	16	24	4	7	11	—	—
Totals	—	—	—	—	—	—	—	115	53	19·6	69	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	34
Extreme values	—	—	—	103†	28††	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of years' observations	16–17							10		16–17																						16–17	

Standard of time: 30° E. meridian.

† Highest recorded temperature.
†† Lowest recorded temperature.

¶ From observations made at Capetown (Royal Obsy.) 33° 56′ S., 18° 29′ E., height 40 feet.

Authorities:—MS. data supplied by Weather Bureau, Department of Transport, Pretoria.

METEOROLOGICAL OFFICE,
AIR MINISTRY.

PLACE—CAPE AGULHAS. LAT. 34° 50′ S., LONG. 20° 1′ E. Height above Mean Sea Level, 62 feet.

Climatic Table compiled from 7 to 20 Years' Observations, 1931 to 1950.

MONTH	PRESSURE at M.S.L.	AIR TEMPERATURE Mean of				Relative humidity		SKY No. of days		RAIN		WIND DIRECTION																		Mean wind force Beaufort scale		No. of days with wind speed 33 knots or more	No. of days with visibility less than ½ n. mile
												0830 Percentage of observations from									1500 Percentage of observations from												
	Mean	Daily max.	Daily min.	Highest in each month	Lowest in each month	0830	1500	Clear	Cloudy	Average fall	No. of days with 0·04 in. or more	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	0830	1500		
	mb.	° F.	° F.	° F.	° F.	%	%			in.																							
January	1016	74	63	79	54	82	73	—	—	0·8	4	0	6	32	10	7	17	22	4	2	0	1	21	22	12	23	21	0	0	3	4	0·3	0·8
February	1016	74	63	79	56	85	75	—	—	0·9	4	3	8	35	9	8	10	18	5	4	0	2	25	19	16	23	15	0	0	3	3	0·5	2
March	1017	72	61	79	53	89	77	—	—	1·2	6	4	8	30	10	6	9	21	7	5	0	2	30	19	8	16	23	1	1	3	3	0·4	3
April	1018	69	58	78	51	88	80	—	—	1·6	7	6	8	25	5	5	10	25	13	3	1	3	29	7	7	12	35	4	2	3	3	0·5	3
May	1018	66	55	77	47	87	77	—	—	1·9	8	9	13	14	2	3	9	32	15	3	2	5	20	2	5	9	50	5	2	3	3	0·3	2
June	1021	63	52	79	45	86	75	—	—	2·1	8	10	14	10	2	2	7	29	23	3	4	5	15	6	5	12	44	7	2	3	3	0·7	1
July	1021	61	50	74	43	88	75	—	—	2·3	10	10	11	7	1	3	8	35	22	3	2	2	13	5	3	13	51	10	1	3	3	1	1
August	1021	63	51	77	44	87	77	—	—	1·9	8	9	10	14	1	3	10	33	16	4	2	4	21	6	3	16	41	7	0	3	4	0·2	2
September	1020	63	52	73	44	86	76	—	—	2·1	8	5	12	22	4	6	13	24	9	5	0	1	25	10	6	21	34	2	1	3	4	0·9	2
October	1019	66	55	73	46	84	76	—	—	1·8	7	3	7	25	10	6	10	29	8	2	1	2	22	13	13	19	29	0	1	3	4	0·3	0·8
November	1017	69	59	84	50	84	76	—	—	1·3	5	1	5	33	9	8	14	21	6	3	0	1	25	15	13	23	20	3	0	3	4	0·7	1
December	1016	72	61	78	52	82	73	—	—	0·8	5	1	5	21	11	10	19	29	3	1	0	0	16	15	14	26	28	1	0	3	4	0·9	1
Means	1018	68	57	—	—	86	76	—	—	—	—	5	9	22	6	6	11	27	11	3	1	2	22	12	9	18	32	3	1	3	8	—	—
Totals	—	—	—	—	—	—	—	—	—	18·7	80	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	20
Extreme values	—	—	—	96†	39††	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of years' observations	20						8			20		8																				7	20

Standard of time: 30° E. meridian.

† Highest recorded temperature. †† Lowest recorded temperature.

Authorities :—MS. data supplied by Weather Bureau, Department of Transport, Pretoria.

METEOROLOGICAL OFFICE,
AIR MINISTRY.

PLACE—CAPE ST. BLAIZE (MOSSEL BAY). LAT. 34° 11′ S., LONG. 22° 9′ E. Height above Mean Sea Level, 198 feet.
Climatic Table compiled from 3 to 20 Years' Observations, 1931 to 1950.

MONTH	PRESSURE at M.S.L.	AIR TEMPERATURE Mean of				Relative humidity		SKY * No. of days		RAIN		WIND DIRECTION																		Mean wind force Beaufort scale		No. of days with wind speed 33 knots or more	No. of days with visibility less than ½ n. mile
												0830									1500												
												Percentage of observations from									Percentage of observations from												
	Mean	Daily max.	Daily min.	Highest in each month	Lowest in each month	0830	1500	Clear ‡	Cloudy ‡‡	Average fall	No. of days with 0·04 in. or more	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	0830	1500		
	mb.	° F.	° F.	° F.	° F.	%	%			in.																							
January	1015	76	64	83	56	79	71	1	8	1·0	5	7	7	11	8	8	35	7	14	3	0	0	6	33	24	37	0	0	0	2	3	0	2
February	1015	76	65	84	58	83	74	5	10	1·0	4	4	9	12	9	3	32	10	20	1	0	1	10	30	26	32	1	0	0	2	3	0	3
March	1016	74	63	84	56	86	76	3	10	1·4	6	7	6	8	7	5	26	8	27	6	0	3	9	29	18	39	1	1	0	2	3	0	3
April	1017	72	59	85	51	84	73	5	9	1·3	5	5	4	4	3	1	18	19	41	5	2	1	8	17	15	49	5	2	1	2	3	0	3
May	1019	69	56	84	48	79	71	7	10	1·3	5	7	1	1	2	1	13	22	49	4	4	4	6	12	13	41	3	14	3	2	3	0	1
June	1022	68	53	82	46	77	71	12	7	0·9	5	6	2	1	0	1	8	19	61	2	4	5	8	7	10	41	9	15	1	2	3	0	1
July	1021	66	51	80	44	79	66	8	7	1·4	5	8	2	0	1	0	15	17	57	0	3	2	7	7	12	39	12	17	1	2	3	0	0·9
August	1021	67	52	83	45	79	70	9	9	1·0	5	5	3	2	0	0	15	22	52	1	4	6	9	13	8	49	2	9	0	2	3	0	2
September	1020	67	54	83	46	82	74	6	10	1·7	7	6	7	6	3	4	14	18	39	3	2	3	13	18	14	45	4	1	0	2	3	0	3
October	1019	69	57	78	49	81	74	5	9	1·5	7	8	5	11	7	5	33	12	17	2	0	2	11	20	16	43	2	5	1	3	4	0	2
November	1017	71	59	80	52	81	72	6	11	1·5	5	5	11	11	9	4	37	10	10	3	0	0	9	29	20	41	1	0	0	2	4	1	2
December	1015	74	62	81	54	77	70	2	8	1·2	4	7	9	8	8	5	37	12	12	2	0	0	5	25	22	47	1	0	0	2	4	0	1
Means	1018	71	58	—	—	81	72	—	—	—	—	6	5	6	5	3	24	15	33	3	2	2	8	20	17	42	3	5	1	2	3	—	—
Totals	—	—	—	—	—	—	—	69	108	15·2	63	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	24
Extreme values	—	—	—	104†	39††	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of years' observations	20						7	3		20		7																				10	20

Standard of time: 30° E. meridian.

† Highest recorded temperature.
†† Lowest recorded temperature.

* From observations made at 34° 11′ S., 22° 7′ E., height 377 feet.

‡ 90% or more of possible sunshine.
‡‡ Less than 50% of possible sunshine.

Authorities:—MS. data supplied by Weather Bureau, Department of Transport, Pretoria.

METEOROLOGICAL OFFICE,
AIR MINISTRY.

PLACE—PORT ELIZABETH (AIRPORT). LAT. 33° 59′ S., LONG. 25° 36′ E. Height above Mean Sea Level, 205 feet.
Climatic Table compiled from 7 to 19 Years' Observations, 1865 to 1950.

MONTH	PRESSURE at M.S.L.	AIR TEMPERATURE Mean of				Relative humidity		SKY No. of days		RAIN		WIND DIRECTION																		Mean wind speed		No. of days with wind * speed 33 knots or more	No. of days with visibility less than ½ n. mile
												0730									1330												
												Percentage of observations from									Percentage of observations from												
	Mean	Daily max.	Daily min.	Highest in each month	Lowest in each month	0500	1300	Clear ‡	Cloudy ‡‡	Average fall	No. of days with 0·04 in. or more	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	0730	1330		
	mb.	° F.	° F.	° F.	° F.	%	%			in.																				knots			
January	1015	78	61	90	51	92	66	3	9	1·2	5	4	11	9	6	2	20	25	4	19	0	2	25	19	15	29	10	0	0	7	14	1	2
February	1015	78	62	89	52	93	69	5	8	1·3	5	2	7	14	8	4	16	21	4	24	0	1	21	27	13	27	10	0	1	7	13	0·7	3
March	1016	76	60	93	48	93	68	5	9	1·9	6	6	10	7	3	2	16	25	6	25	1	4	20	21	10	25	17	1	1	6	12	0·5	3
April	1017	73	55	91	44	89	65	7	7	1·5	5	7	5	3	2	1	11	29	16	26	1	3	18	10	7	31	23	3	4	6	12	0·1	2
May	1018	71	50	88	39	87	61	9	8	2·3	6	13	4	1	1	1	8	21	21	30	6	7	13	5	4	26	22	7	10	6	10	0	2
June	1021	68	45	82	36	87	59	12	6	2·7	5	12	2	1	1	1	9	22	24	28	9	8	9	2	4	20	23	11	14	6	9	0	2
July	1021	67	45	83	35	85	60	11	6	1·9	5	10	3	0	0	0	12	27	28	20	7	8	7	3	2	25	27	11	10	7	10	0·4	2
August	1021	68	47	89	36	88	62	9	6	1·8	6	11	5	2	1	0	8	32	21	20	5	7	14	5	5	27	27	5	5	8	11	0·3	1
September	1019	68	50	90	39	89	66	5	9	1·9	7	11	4	4	4	2	11	31	11	22	1	4	20	11	10	31	18	3	2	8	13	0·3	1
October	1018	70	54	83	41	90	68	4	10	2·0	7	4	10	11	5	2	15	31	6	16	0	1	22	14	12	35	14	1	1	9	15	1	0·8
November	1015	72	57	87	46	91	67	9	9	2·5	6	5	12	11	3	2	21	28	6	12	0	1	22	17	10	35	15	0	0	10	16	0·6	0·9
December	1015	75	59	87	49	91	66	1	8	2·0	6	5	6	8	3	3	22	31	5	17	0	1	18	16	14	36	15	0	0	9	15	0·9	0·7
Means	1018	72	54	—	—	90	65	—	—	—	—	7	6	6	3	2	14	27	13	22	3	4	17	13	9	29	18	3	4	7	13	—	—
Totals	—	—	—	—	—	—	—	80	95	23·0	69	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6	20
Extreme values	—	—	—	104†	31††	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of years' observations	14											7–9																				19	14

Standard of time: 30° E. meridian.

† Highest recorded temperature.
†† Lowest recorded temperature.

‡ 90% or more of possible sunshine.
‡‡ Less than 50% of possible sunshine.

* From observations at 33° 58′ S., 25° 37′ E., height 181 feet.

Authorities:—MS. data supplied by Weather Bureau, Department of Transport, Pretoria.

METEOROLOGICAL OFFICE,
AIR MINISTRY.

PLACE—EAST LONDON (AIRPORT). LAT. 33° 02′ S., LONG. 27° 50′ E. Height above Mean Sea Level, 411 feet.
Climatic Table compiled from 8 to 17 Years' Observations, 1877 to 1950.

MONTH	PRESSURE at M.S.L.	AIR TEMPERATURE Mean of				Relative humidity		SKY No. of days		RAIN		WIND DIRECTION																		Mean wind speed		No. of days with wind speed 33 knots or more *	No. of days with visibility less than ½ n. mile
	Mean	Daily max.	Daily min.	Highest in each month	Lowest in each month	0500	1200	Clear ‡	Cloudy ‡‡	Average fall	No. of days with 0·04 in. or more	0730 Percentage of observations from									1330 Percentage of observations from									0730	1330		
												N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm				
	mb.	° F.	° F.	° F.	° F.	%	%			in.																				knots			
January . .	1015	77	64	87	58	89	72	5	12	2·7	8	6	23	5	1	2	24	20	4	15	0	14	28	14	19	23	1	0	1	8	14	2	0·7
February . .	1015	78	65	89	58	89	72	5	12	2·5	9	7	22	5	1	1	21	25	4	14	1	15	27	11	19	26	1	0	0	7	14	0·8	1
March . . .	1016	77	63	87	56	89	72	6	11	3·8	9	11	19	3	1	2	14	23	6	21	1	22	26	9	16	24	1	0	1	6	13	0·4	0·9
April . . .	1017	74	59	89	50	84	67	8	8	3·2	6	15	11	1	0	1	9	30	20	13	1	14	19	9	19	30	7	0	1	7	12	2	0·8
May . . .	1019	73	55	87	45	76	58	12	7	1·8	4	22	6	0	1	0	5	30	32	4	2	14	15	11	15	22	11	4	6	9	10	1	0·5
June . . .	1021	70	51	83	42	71	51	12	5	1·4	2	16	2	0	0	0	4	30	43	5	3	7	11	16	13	22	15	5	8	9	9	0·8	0·2
July . . .	1021	70	50	87	41	67	49	14	4	0·7	2	17	2	0	0	0	5	26	45	5	2	9	9	11	15	26	18	6	4	9	11	2	0·3
August . .	1021	70	52	91	43	77	57	9	7	1·5	4	18	9	1	1	0	10	31	25	5	2	13	17	10	18	26	8	4	1	9	12	2	0·8
September .	1019	71	55	92	46	82	65	7	7	2·3	6	12	9	3	1	1	13	34	17	10	0	12	19	13	17	30	6	1	2	8	13	3	0·4
October . .	1018	71	58	88	49	87	72	3	10	4·3	9	7	20	4	2	1	23	28	7	8	0	15	21	10	21	30	2	0	1	10	15	3	1
November .	1015	73	60	85	52	87	72	4	9	4·1	8	5	24	8	2	2	22	25	3	9	0	15	26	10	21	25	2	0	1	10	16	2	1
December . .	1014	75	62	86	54	87	71	3	13	3·3	9	4	17	7	1	3	28	25	3	12	0	12	21	11	27	27	2	0	0	9	15	2	0·6
Means . . .	1018	73	58	—	—	82	65	—	—	—	—	12	14	8	1	1	15	27	17	10	1	14	20	11	18	26	6	2	2	8	13	—	—
Totals . . .	—	—	—	—	—	—	—	88	105	31·6	76	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	21	8
Extreme values	—	—	—	106†	38††	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of years' observations	8–9																															17	8–9

Standard of time: 30° E. meridian.

† Highest recorded temperature.
†† Lowest recorded temperature.

‡ 90% or more of possible sunshine.
‡‡ Less than 50% of possible sunshine.

* At 33° 1′ S., 27° 54′ E., height 149 feet.

Authorities:—MS. data supplied by Weather Bureau, Department of Transport, Pretoria.

METEOROLOGICAL OFFICE,
AIR MINISTRY.

PLACE—DURBAN (AIRPORT). LAT. 29° 50′ S., LONG. 31° 2′ E. Height above Mean Sea Level, 15 feet.

Climatic Table compiled from 12 to 15 Years' Observations, 1936 to 1950.

MONTH	PRESSURE at M.S.L.	AIR TEMPERATURE Mean of				Relative humidity		SKY No. of days		RAIN		WIND DIRECTION																		Mean wind speed		No. of days with gale	No. of days with visibility less than ⅝ n. mile
												0730									1330												
												Percentage of observations from									Percentage of observations from												
	Mean	Daily max.	Daily min.	Highest in each month	Lowest in each month	0500	1200	Clear ‡	Cloudy ‡‡	Average fall	No. of days with 0·04 in. or more	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	0730	1330		
	mb.	° F.	° F.	° F.	° F.	%	%			in.																				knots			
January	1014	81	69	87	62	87	74	2	16	3·4	10	12	20	0	1	13	29	2	2	21	3	31	17	12	27	8	0	0	2	7	11	—	0·1
February	1014	81	69	87	63	88	75	3	11	5·6	9	14	17	0	1	9	22	4	4	29	1	35	20	14	20	7	0	0	3	5	10	—	0·1
March	1015	80	68	86	61	90	75	1	13	4·1	9	14	7	0	1	5	24	6	6	37	3	35	16	13	23	8	0	0	2	4	10	—	0·4
April	1017	78	64	86	55	89	71	4	10	3·4	7	10	3	0	0	4	22	10	10	41	4	33	15	13	23	10	0	0	2	4	9	—	0·4
May	1019	75	57	83	49	83	64	9	7	2·5	4	11	1	0	0	2	16	8	21	41	4	39	12	12	21	7	0	0	5	3	8	—	0·1
June	1022	73	53	81	45	79	59	8	7	1·2	3	8	0	0	0	2	16	8	23	43	4	34	10	11	23	8	1	0	9	3	7	—	0
July	1022	72	52	83	44	80	60	5	7	0·9	3	10	1	0	0	3	17	9	22	38	4	36	12	12	22	8	0	1	5	4	9	—	0·3
August	1021	72	55	81	45	85	67	3	8	1·3	4	17	2	0	0	4	19	7	15	36	6	39	11	12	23	8	0	0	1	4	11	—	0·5
September	1019	73	59	89	49	86	71	0·8	14	1·9	6	20	8	0	0	7	28	4	7	26	6	34	11	13	24	10	0	0	2	6	11	—	0·2
October	1017	75	62	83	54	86	74	1	17	3·1	10	16	17	1	0	11	32	2	2	19	5	29	13	13	28	9	0	0	3	8	11	—	0·3
November	1015	77	65	87	56	87	74	1	16	4·9	11	12	21	2	1	15	30	2	3	14	4	32	13	11	29	8	0	1	2	8	12	—	0·3
December	1014	79	67	87	59	87	74	1	17	4·3	10	9	20	0	2	15	29	3	2	20	2	27	16	16	25	10	0	0	4	7	11	—	0·3
Means	1017	76	62	—	—	86	70	—	—	—	—	13	10	0	1	7	24	5	10	30	4	33	14	13	24	9	0	0	3	5	10	—	—
Totals	—	—	—	—	—	—	—	39	143	36·6	86	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3
Extreme values	—	—	—	107†	39††	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of years' observations	14–15											12																					14-15

Standard of time: 30° E. meridian.

† Highest recorded temperature.
†† Lowest recorded temperature.

‡ 90% or more of possible sunshine.
‡‡ Less than 50% of possible sunshine.

Authorities:—MS. data supplied by Weather Bureau, Department of Transport, Pretoria.

METEOROLOGICAL OFFICE,
AIR MINISTRY.

PLACE—DURBAN (POINT). LAT. 29° 52′ S., LONG. 31° 3′ E. Height above Mean Sea Level, 50 feet.
Climatic Table compiled from 4 to 40 Years' Observations, 1884 to 1935.

MONTH	PRESSURE at M.S.L.	AIR TEMPERATURE Mean of				Relative humidity		SKY No. of days (estimated)		RAIN		WIND DIRECTION																		Mean wind force Beaufort scale	No. of days with wind speed 33 knots or more ‡‡	No. of days with fog ‡
												Hourly observations																				
												Percentage of observations from									Percentage of observations from											
	Mean	Daily max.	Daily min.	Highest in each month	Lowest in each month	0830	1500	Clear: < 2 oktas	Cloudy: > 6 oktas	Average fall	No. of days with 0·01 in. or more	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm			
	mb.	° F.	° F.	° F.	° F.	%	%			in.																						
January . .	1015	82	70	88	63	78	76	4	10	4·6	13	3	30	13	3	6	33	9	1	2	—	—	—	—	—	—	—	—	—	1	3	0·2
February . .	1016	82	70	89	64	79	80	6	9	5·3	11	4	33	14	5	7	25	9	1	2	—	—	—	—	—	—	—	—	—	1	2	0·1
March . . .	1017	80	69	87	62	79	78	6	8	6·0	13	4	26	13	3	6	31	13	0	4	—	—	—	—	—	—	—	—	—	1	2	0·3
April . . .	1019	78	66	84	58	76	77	10	5	3·6	8	5	25	8	3	7	32	14	1	5	—	—	—	—	—	—	—	—	—	1	2	0
May . . .	1021	75	60	81	53	75	73	14	3	2·6	6	6	22	8	3	7	33	16	1	4	—	—	—	—	—	—	—	—	—	1	2	0
June . . .	1023	73	56	79	47	71	71	18	2	1·8	4	9	21	6	1	8	33	16	2	4	—	—	—	—	—	—	—	—	—	1	2	0
July . . .	1024	71	55	81	49	72	70	17	2	1·7	4	7	22	9	3	7	28	17	2	5	—	—	—	—	—	—	—	—	—	1	3	0
August . .	1022	72	58	79	51	74	74	12	4	1·8	6	8	29	7	1	7	29	14	2	3	—	—	—	—	—	—	—	—	—	1	6	0·3
September .	1021	73	61	82	53	74	76	7	7	2·7	9	4	32	9	2	6	32	11	1	3	—	—	—	—	—	—	—	—	—	1	4	0·3
October . .	1019	75	64	84	56	76	78	4	11	5·1	13	4	25	10	3	7	34	13	1	3	—	—	—	—	—	—	—	—	—	1	7	0·2
November .	1016	77	66	85	58	77	80	3	12	4·7	14	3	27	11	3	11	32	10	1	2	—	—	—	—	—	—	—	—	—	1	8	0·1
December . .	1015	80	68	87	61	80	78	4	11	5·2	14	3	27	12	3	8	32	11	1	3	—	—	—	—	—	—	—	—	—	1	5	0·1
Means . . .	1019	76	64	92*	48**	76	76	—	—	—	—	5	27	10	3	7	31	13	1	3	—	—	—	—	—	—	—	—	—	1	—	—
Totals . . .	—	—	—	—	—	—	—	105	84	45·1	115	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	46	2
Extreme values	—	—	—	102†	46††	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of years' observations	35–36	23				5		25		40		5																		25-26	4	20

Standard of time: 30° E. meridian.

* Mean of highest each year.
** Mean of lowest each year.

† Highest recorded temperature.
†† Lowest recorded temperature.

‡ Undefined.
‡‡ Anemometer height 270 feet above M.S.L.

Authorities :—MS. data supplied by Meteor. Office, Pretoria.

METEOROLOGICAL OFFICE,
AIR MINISTRY.

PLACE—LOURENÇO MARQUES. LAT. 25° 58′ S., LONG. 32° 36′ E. Height above Mean Sea Level, 194 feet.

Climatic Table compiled from 20 to 42 Years' Observations, 1910 to 1951.

MONTH	PRES-SURE at M.S.L.	AIR TEMPERATURE Mean of				Relative humidity		SKY No. of days		RAIN		WIND DIRECTION																		Mean wind speed		No. of days with wind speed over 24 knots	No. of days with visibility less than ½ n. mile
												a.m. ‡									p.m. ‡												
												Percentage of observations from									Percentage of observations from									a.m. ‡	p.m. ‡		
	Mean	Daily max.	Daily min.	Highest in each month	Lowest in each month	0900	1500	Clear: < 2 oktas	Cloudy: > 6 oktas	Average fall	No. of days with 0·04 in. or more	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm				
	mb.	° F.	° F.	° F.	° F.	%	%			in.																				knots			
January	1013	86	71	99	65	72	66	3	10	5·1	9	10	8	10	11	24	20	5	9	3	3	21	34	21	15	4	1	1	0	7	11	0·7	0·1
February	1013	87	71	96	66	73	65	3	8	4·9	8	9	6	9	10	25	23	6	9	3	2	22	36	20	14	5	0	1	0	7	10	0·4	0·3
March	1015	85	69	95	63	75	67	5	8	4·9	9	9	4	6	8	24	27	8	11	3	6	22	29	19	15	6	1	1	1	7	9	0·5	0·2
April	1017	83	66	94	59	72	63	9	4	2·1	5	12	3	4	6	19	26	11	17	2	9	26	25	14	13	6	2	4	1	7	8	0·3	1
May	1019	80	60	91	54	71	61	15	3	1·1	3	13	2	2	4	16	27	14	21	1	12	23	20	18	14	8	3	6	1	8	8	0·3	3
June	1022	77	56	87	50	70	57	18	2	0·8	2	12	1	2	3	14	29	15	23	1	15	21	17	12	13	10	4	7	1	8	8	0·2	4
July	1023	76	55	89	50	71	59	18	3	0·5	2	15	2	2	4	14	25	13	24	1	15	25	18	12	13	7	3	6	1	8	8	0·2	3
August	1022	78	57	93	51	68	60	16	3	0·5	2	18	3	3	5	16	22	11	21	1	11	30	23	13	12	5	1	4	1	8	10	0·5	3
September	1019	80	61	98	54	65	63	11	5	1·1	3	18	7	6	8	19	18	7	15	2	8	30	26	14	13	4	1	3	1	8	11	1	1
October	1017	82	64	100	57	65	66	7	9	1·9	5	16	9	8	9	22	17	5	12	2	16	18	26	18	15	4	1	2	0	8	11	1	0·7
November	1015	83	67	100	60	67	67	4	11	3·2	7	15	10	10	10	21	16	5	10	3	5	23	29	16	14	4	1	2	1	8	11	1	0·1
December	1013	85	69	100	63	69	66	3	11	3·8	9	14	9	10	10	22	17	4	10	4	4	25	34	17	13	3	1	2	1	7	11	0·9	0·1
Means	1017	82	64	105*	48**	70	63	—	—	—	—	14	5	6	7	20	22	9	15	2	9	24	26	16	13	6	2	3	1	8	10	—	—
Totals	—	—	—	—	—	—	—	112	77	29·9	64	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	16
Extreme values	—	—	—	114†	45††	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of years' observations	42					20		42																									

* Mean of highest each year.
** Mean of lowest each year.

Standard of time: 30° E. meridian.

† Highest recorded temperature.
†† Lowest recorded temperature.

‡ Mean of hourly observations.

Authorities:—MS. data supplied by Serviço Meteorologico de Moçambique, Lourenço Marques.

METEOROLOGICAL OFFICE,
AIR MINISTRY.

PLACE—BEIRA. LAT. 19° 50′ S., LONG. 34° 51′ E. Height above Mean Sea Level, 28 feet.
Climatic Table compiled from 4 to 39 Years' Observations, 1913 to 1951.

MONTH	PRESSURE at M.S.L.	AIR TEMPERATURE Mean of				Relative humidity		SKY No. of days		RAIN		WIND DIRECTION																		Mean wind force		No. of days with wind speed over 24 knots	No. of days with visibility less than ½ n. mile
												a.m. ‡									p.m. ‡												
												Percentage of observations from									Percentage of observations from												
	Mean	Daily max.	Daily min.	Highest in each month	Lowest in each month	0900	1500	Clear: < 2 oktas	Cloudy: > 6 oktas	Average fall	No. of days with 0·04 in. or more	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	‡ a.m.	‡ p.m.		
	mb.	° F.	° F.	° F.	° F.	%	%			in.																				knots			
January	1010	89	75	93	69	74	67	2	8	10·9	12	11	6	10	18	14	12	7	4	18	2	9	41	31	3	6	1	1	6	6	9	0·3	0
February	1010	89	75	93	69	76	65	3	7	8·4	11	8	6	8	15	19	13	9	5	17	2	9	35	34	5	7	1	2	5	7	9	0·3	0
March	1012	87	74	92	68	77	65	5	8	10·1	13	6	5	7	12	23	13	8	6	20	2	9	37	32	5	7	1	1	6	7	8	0·1	0
April	1015	86	71	93	65	78	64	9	4	4·2	8	11	5	5	8	20	13	11	10	17	3	13	37	25	3	5	2	2	10	6	7	0·2	0·5
May	1018	82	65	90	59	78	63	13	3	2·2	6	10	4	3	5	25	14	16	14	9	3	1	33	27	6	12	3	2	13	6	6	0	2
June	1021	79	61	87	55	81	63	13	3	1·3	5	8	3	2	3	30	15	16	14	9	2	11	21	26	12	14	2	2	10	7	6	0	4
July	1022	77	61	87	55	81	63	11	3	1·2	4	7	4	3	5	26	15	15	14	11	2	12	30	28	3	11	2	2	10	6	7	0	5
August	1021	78	62	86	55	79	65	12	2	1·1	3	10	7	4	10	20	13	12	10	14	1	12	41	31	2	6	1	1	5	6	8	0·1	3
September	1016	82	65	90	58	73	65	10	3	0·8	3	13	6	8	18	10	12	8	6	19	2	12	54	24	2	2	1	1	2	6	10	0·4	2
October	1013	87	71	92	61	68	66	9	4	5·2	3	12	8	15	19	5	7	5	6	23	1	10	65	18	1	2	1	0	2	7	11	0·6	0·4
November	1013	87	72	96	64	67	64	4	8	5·3	7	13	11	14	15	4	9	5	6	23	2	11	56	22	1	2	0	2	4	7	10	0·4	0·1
December	1011	88	73	95	67	70	67	3	9	9·2	10	12	9	9	17	11	8	6	6	22	3	11	46	23	4	4	1	2	6	6	9	0·3	0·1
Means	1015	84	69	101*	53**	75	65	—	—	—	—	10	6	7	12	17	12	10	9	17	2	10	41	27	4	7	1	2	6	6	8	—	—
Totals	—	—	—	—	—	—	—	94	62	59·9	85	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	17
Extreme values	—	—	—	109†	48††	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of years' observations	39	37		39		4		33		39	36	18																					22

Standard of time: 30° E. meridian.

* Mean of highest each year.
** Mean of lowest each year.
† Highest recorded temperature.
†† Lowest recorded temperature.
‡ Mean of hourly observations.

Authorities:—MS. data supplied by Serviço Meteorologico de Moçambique, Lourenço Marques.

METEOROLOGICAL OFFICE,
AIR MINISTRY.

PLACE—MOSSURIL. LAT. 14° 57′ S., LONG. 40° 40′ E. Height above Mean Sea Level, 49 feet.

Climatic Table compiled from 10 to 27 Years' Observations, 1924 to 1951.

MONTH	PRESSURE at M.S.L.	AIR TEMPERATURE Mean of				Relative humidity		SKY No. of days		RAIN		WIND DIRECTION																		Mean wind speed			
												a.m.‡									p.m.‡												
												Percentage of observations from									Percentage of observations from												
	Mean	Daily max.	Daily min.	Highest in each month	Lowest in each month	0900	1500	Clear: < 2 oktas	Cloudy: > 6 oktas	Average fall	No. of days with 0·04 in. or more	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	a.m. ‡	p.m. ‡	No. of days with wind speed over 24 knots	No. of days with visibility less than ⅝ n. mile
	mb.	° F.	° F.	° F.	° F.	%	%			in.																				knots			
January	1009	90	74	96	71	72	70	0·6	15	8·9	13	12	7	2	1	2	7	6	3	60	5	21	8	5	8	5	4	2	42	2	4	0·1	0·1
February	1009	90	74	95	71	75	68	0·2	14	8·7	12	9	5	1	1	2	8	7	4	63	7	14	6	5	9	7	4	2	46	2	4	0·1	0·4
March	1010	89	74	94	71	76	71	1	11	5·6	11	4	2	1	1	4	11	9	2	66	2	7	5	6	15	10	4	1	50	2	3	0	0·2
April	1013	88	72	92	68	75	68	4	6	3·2	8	1	0	0	1	9	22	14	1	52	0	1	2	6	27	19	6	1	38	4	5	0·1	0·5
May	1015	85	68	89	62	73	65	9	4	1·2	3	2	0	0	1	9	22	16	1	49	0	1	2	5	28	22	5	0	37	3	5	0	1
June	1018	82	65	86	59	74	65	9	3	1·2	4	2	0	0	1	7	22	21	2	45	0	1	2	4	24	25	9	1	34	5	6	0·2	1
July	1019	81	63	85	58	73	63	9	3	0·6	3	2	0	0	0	10	19	21	2	46	0	2	3	4	31	17	8	0	35	4	6	0·1	2
August	1018	82	63	87	59	70	65	8	3	0·5	2	2	1	1	1	13	17	12	1	52	0	2	6	7	34	12	4	0	35	4	6	0	4
September	1017	85	65	91	60	66	63	9	1	0·4	1	2	6	4	2	10	11	5	1	59	1	14	12	6	20	8	2	0	37	4	5	0·1	4
October	1015	88	69	94	63	62	61	11	1	0·4	1	4	10	5	2	7	6	3	1	62	1	21	18	5	14	5	1	0	35	3	5	0	1
November	1012	91	73	96	69	60	62	7	4	1·2	3	4	16	5	2	6	7	3	1	56	1	34	11	6	12	5	1	0	30	4	6	0	0·1
December	1011	91	75	97	71	65	66	2	11	5·5	8	6	12	4	2	4	4	4	2	62	3	29	10	4	8	4	3	1	38	3	4	0·1	0
Means	1014	87	70	98*	57**	70	65	—	—	—	—	4	5	2	1	7	13	10	2	56	2	12	7	5	19	12	4	1	38	3	5	—	—
Totals	—	—	—	—	—	—	—	70	76	37·4	69	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0·8	14
Extreme values	—	—	—	101†	53††	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of years' observations	26			27		10		27		26	27	23																				26	27

Standard of time: 30° E. meridian.

* Mean of highest each year.
** Mean of lowest each year.

† Highest recorded temperature.
†† Lowest recorded temperature.

‡ Mean of hourly observations.

Authorities:—MS. data supplied by Serviço Meteorologico de Moçambique, Lourenço Marques.

METEOROLOGICAL OFFICE,
AIR MINISTRY.

PLACE—LINDI. LAT. 10° 0′ S., LONG. 39° 42′ E. Height above Mean Sea Level, 26 feet.

Climatic Table compiled from 9 to 21 Years' Observations, 1891 to 1951.

MONTH	PRESSURE at M.S.L.	AIR TEMPERATURE Mean of				Relative humidity		SKY No. of days (estimated)		RAIN		WIND DIRECTION																		Mean wind speed		No. of days with wind speed 34 knots or more	No. of days with visibility less than 1 n. mile
												0830									1430												
												Percentage of observations from									Percentage of observations from												
	Mean	Daily max.	Daily min.	Highest in each month	Lowest in each month	0830	1430	Clear: < 2 oktas	Cloudy: > 6 oktas	Average fall	No. of days with 0·04 in. or more	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	0830	1430		
	mb.	° F.	° F.	° F.	° F.	%	%			in.																				knots			
January . .	1011	88	75	91	71	84	74	6	8	5·7	12	12	1	1	16	19	17	1	19	14	16	62	5	2	1	2	1	6	5	3	8	0	0·2
February . .	1011	88	74	92	71	86	73	6	8	4·6	10	5	2	2	14	26	25	1	13	12	12	64	8	3	1	3	1	5	3	3	8	0	0·2
March . . .	1011	88	74	92	71	88	73	6	8	6·7	13	3	1	0	10	37	40	1	2	6	16	51	8	10	4	4	0	2	5	4	7	0	0
April . . .	1013	88	73	92	71	86	74	8	6	6·8	14	0	0	1	4	29	65	0	0	1	9	28	10	21	16	8	1	1	6	6	6	0	0·1
May . . .	1015	87	70	90	65	83	64	11	4	1·5	6	0	0	0	1	29	68	1	0	1	7	23	5	35	22	4	0	1	3	7	7	0	0
June . . .	1017	87	67	89	61	80	56	14	3	0·4	2	0	0	0	3	31	64	1	0	1	8	21	5	36	21	6	0	2	1	7	8	0	0·1
July . . .	1018	86	66	88	61	79	57	11	4	0·3	1	0	0	1	5	37	56	0	0	1	8	38	7	27	12	5	0	1	2	6	9	0	0
August . .	1017	85	67	91	63	79	61	12	4	0·2	1	0	0	0	9	36	53	0	0	2	10	62	10	11	3	2	0	1	1	6	10	0	0
September .	1017	85	68	90	64	80	65	12	4	0·5	2	1	4	2	13	36	38	0	0	6	14	75	7	2	1	0	0	0	1	5	10	0	0
October . .	1015	85	71	89	67	77	68	12	4	0·6	2	3	25	10	18	23	13	1	0	7	15	76	8	1	0	0	0	0	0	4	11	0	0
November .	1013	87	74	91	70	78	70	12	4	2·1	6	5	32	11	16	13	14	0	1	8	8	81	7	1	0	1	0	1	1	4	10	0	0
December .	1012	88	75	92	71	82	72	8	7	5·9	11	9	9	4	19	22	17	1	5	14	12	74	6	2	1	1	0	2	2	3	10	0	0·1
Means . . .	1014	87	71	93*	59**	82	67	—	—	—	—	3	6	3	11	28	39	1	3	6	12	55	7	12	7	3	0	2	2	5	9	—	—
Totals . . .	—	—	—	—	—	—	—	118	64	35·3	80	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0	0·7
Extreme values	—	—	—	97†	54††	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of years' observations	14	21		17				9–13		21	20	17																		13			10

Standard of time: 45° E. meridian.

* Mean of highest each year.
** Mean of lowest each year.

† Highest recorded temperature } in 21 years' observations.
†† Lowest recorded temperature }

Authorities:—MS. data supplied by East African Meteorological Department, Nairobi.
Berlin, Mitteilungen aus den deutschen Schutzgebieten.

METEOROLOGICAL OFFICE,
AIR MINISTRY.

PLACE—KILWA. LAT. 8° 45′ S., LONG. 39° 24′ E. Height above Mean Sea Level, 30 feet.

Climatic Table compiled from 4 to 27 Years' Observations, 1891 to 1937.

MONTH	PRESSURE at M.S.L.	AIR TEMPERATURE Mean of				Relative humidity		SKY No. of days (estimated)		RAIN		WIND DIRECTION																		Mean wind force Beaufort scale		No. of days with gale	No. of days with fog
												0700									1400												
												Percentage of observations from									Percentage of observations from												
	Mean	Daily max.	Daily min.	Highest in each month	Lowest in each month	0700	1400	Clear: < 2 oktas	Cloudy: > 6 oktas	Average fall	No. of days with 0·1 in. or more	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	0700	1400		
	mb.	° F.	° F.	° F.	° F.	%	%			in.																							
January . .	—	87	76	90	72	90	78	8	6	5·3	7	18	6	1	1	1	2	22	47	2	41	39	1	0	0	3	3	13	0	1·8	2·9	—	—
February . .	—	88	77	91	72	91	78	8	6	4·5	7	18	4	4	5	3	5	20	40	1	40	33	4	5	3	0	1	9	1	1·5	2·9	—	—
March . . .	—	88	76	92	72	91	75	9	6	6·9	9	8	6	9	9	9	13	16	29	1	32	28	9	14	7	2	3	5	0	1·4	2·4	—	—
April . . .	—	87	75	91	71	90	76	8	6	8·4	10	1	1	5	13	42	15	15	5	3	7	7	28	24	19	3	8	1	3	1·9	3·0	—	—
May . . .	—	87	73	89	69	86	68	13	3	2·5	4	1	1	4	19	45	22	7	1	0	1	3	21	38	25	8	3	1	0	2·2	3·4	—	—
June . . .	—	85	71	88	66	84	68	15	3	0·6	1	0	0	3	24	39	23	10	0	1	1	2	17	52	16	5	4	2	1	2·3	3·5	—	—
July . . .	—	84	69	87	64	85	71	15	3	0·3	0·5	2	1	4	19	53	13	4	2	2	2	3	25	52	12	2	1	2	1	2·0	3·4	—	—
August . .	—	84	70	87	66	87	72	15	3	0·5	0·7	0	1	9	27	47	7	3	0	6	1	8	32	48	9	0	0	0	2	1·9	3·3	—	—
September .	—	85	72	87	68	83	71	13	3	0·8	2	5	13	32	17	21	5	1	2	4	7	28	35	18	6	3	1	1	1	1·9	3·0	—	—
October . .	—	86	75	88	71	79	71	11	4	0·7	2	7	37	29	18	5	0	1	1	2	7	44	31	14	8	0	0	1	0	2·0	3·1	—	—
November .	—	88	77	90	74	82	72	10	5	1·9	4	14	36	24	13	4	0	2	5	2	13	47	21	13	4	0	0	1	1	2·1	2·8	—	—
December . .	—	88	77	90	72	88	77	9	5	4·5	6	21	28	7	2	3	3	9	24	8	17	61	8	1	1	1	1	9	1	1·7	2·9	—	—
Means . . .	—	87	74	93*	64**	86	73	—	—	—	—	8	11	11	14	23	9	9	13	2	15	25	19	23	9	2	2	4	1	1·9	3·1	—	—
Totals . . .	—	—	—	—	—	—	—	134	53	36·9	53	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Extreme values	—	—	—	98†	60††	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of years' observations		7				4–8		9		27	18	9–11																		7–14		—	—

Standard of time: 37½° E. meridian.

* Mean of highest each year.
** Mean of lowest each year.

† Highest recorded temperature } in 19–23 years' observations.
†† Lowest recorded temperature }

Authorities:—MS. data supplied by B.E.A. Meteorological Service, Nairobi.
Berlin, Mitteilungen aus den deutschen Schutzgebieten.

METEOROLOGICAL OFFICE,
AIR MINISTRY.

PLACE—DAR ES SALAAM. LAT. 6° 50′ S., LONG. 39° 17′ E. Height above Mean Sea Level, 30 feet.

Climatic Table compiled from 4 to 35 Years' Observations, 1893 to 1937.

MONTH	PRESSURE at M.S.L.	AIR TEMPERATURE Mean of				Relative humidity		SKY No. of days (estimated)		RAIN		WIND DIRECTION																		Mean wind speed Beaufort scale		No. of days with wind force 8 or more	No. of days with fog ‡
												0700									1400												
												Percentage of observations from									Percentage of observations from												
	Mean	Daily max.	Daily min.	Highest in each month	Lowest in each month	0700	1400	Clear: < 2 oktas	Cloudy: > 6 oktas	Average fall	No. of days with 0·1 in. or more	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	0700	1400		
	mb.	° F.	° F.	° F.	° F.	%	%			in.																							
January	1011	89	77	92	73	85	72	4	10	2·8	4	37	24	4	3	6	7	4	6	9	31	42	19	1	1	1	0	4	1	1·7	2·2	0	1
February	1011	89	77	92	72	86	70	4	11	2·5	4	33	21	3	3	8	12	5	6	14	27	48	17	0	1	1	1	2	3	1·5	2·3	0	1
March	1011	88	76	93	72	90	73	5	9	4·5	8	7	8	4	11	13	29	7	4	17	9	38	29	6	6	4	2	1	5	1·2	2·1	0	2
April	1012	87	74	91	71	93	77	3	13	11·1	14	1	0	0	10	23	50	5	1	10	2	9	16	29	21	13	2	2	6	1·3	2·2	0·1	5
May	1014	85	72	88	69	93	71	5	10	7·2	11	0	0	0	9	24	57	4	0	6	0	2	10	45	27	18	1	0	2	1·5	2·7	0·1	3
June	1016	84	69	87	65	92	61	8	7	1·5	3	0	0	0	10	28	54	5	0	8	0	1	8	47	32	10	1	0	1	1·7	3·1	0·2	5
July	1017	84	67	87	65	93	63	6	8	1·3	3	1	0	1	13	22	55	4	0	4	1	4	12	51	28	3	0	0	1	1·4	3·1	0·3	3
August	1017	84	68	87	64	93	65	7	7	1·0	2	0	0	1	15	22	50	4	1	7	0	11	39	37	11	1	0	0	1	1·3	3·5	1	5
September	1017	84	69	88	66	92	68	10	5	1·1	3	0	2	2	21	18	39	3	0	15	1	21	56	17	4	0	0	0	1	1·1	3·9	0·6	3
October	1015	85	71	88	68	90	70	10	5	1·4	3	0	1	5	18	18	35	3	0	20	1	24	62	11	2	0	0	0	0	1·1	3·6	0·1	1
November	1013	87	74	90	70	88	72	8	6	2·9	5	3	8	9	18	16	21	4	1	20	8	27	58	7	2	1	0	1	1	1·1	3·1	0	0
December	1012	88	77	91	71	86	74	6	8	3·7	6	22	20	6	5	7	13	4	7	16	16	35	35	4	1	1	0	3	5	1·4	2·3	0	1
Means	1014	86	73	93*	63**	90	70	—	—	—	—	9	7	3	11	17	35	4	2	12	8	22	30	21	11	4	1	1	2	1·4	2·8	—	—
Totals	—	—	—	—	—	—	—	76	99	41·0	66	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	30
Extreme values	—	—	—	96†	60††	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of years' observations	4	7				18–20		16–20		35	28-30	18–20																		17–18		16-18	11

Standard of time: 37½° E. meridian.

* Mean of highest each year.
** Mean of lowest each year.

† Highest recorded temperature } in 32 years' observations.
†† Lowest recorded temperature } in 32 years' observations.

‡ Undefined.

Authorities:—MS. data supplied by B.E.A. Meteorological Service, Nairobi.
Berlin, Mitteilungen aus den deutschen Schutzgebieten.

METEOROLOGICAL OFFICE,
AIR MINISTRY.

PLACE—ZANZIBAR (CHUKWANI). LAT. 6° 15′ S., LONG. 39° 13′ E. Height above Mean Sea Level, 61 feet.

Climatic Table compiled from 7 to 21 Years' Observations, 1931 to 1951.

MONTH	PRESSURE at M.S.L.	AIR TEMPERATURE Mean of				Relative humidity		SKY No. of days (estimated)		RAIN		WIND DIRECTION																		Mean wind speed		No. of days with wind speed 34 knots or more	No. of days with visibility less than 1 n. mile
												0830									1430												
												Percentage of observations from									Percentage of observations from												
	Mean	Daily max.	Daily min.	Highest in each month	Lowest in each month	0830	1430	Clear: < 2 oktas	Cloudy: > 6 oktas	Average fall	No. of days with 0·04 in. or more	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	0830	1430		
	mb.	° F.	° F.	° F.	° F.	%	%			in.																				knots			
January	1010	90	76	94	73	81	66	9	6	2·3	7	50	25	4	1	1	4	4	6	5	24	32	7	3	4	4	4	19	3	7	9	0	0
February	1010	91	76	97	74	81	67	8	6	2·6	5	44	25	3	1	1	6	5	6	9	14	21	5	3	6	8	9	30	4	5	8	0	0
March	1010	91	77	96	74	85	72	8	6	5·8	12	16	17	3	2	5	27	11	6	13	10	8	7	11	23	12	9	13	7	6	6	0	0·3
April	1012	86	77	92	73	90	78	6	9	12·6	16	0	1	1	3	11	70	9	1	4	1	2	4	26	42	13	3	2	7	9	8	0	0·6
May	1014	84	75	88	72	89	78	5	10	11·4	14	0	0	1	3	21	72	3	0	0	0	0	1	41	46	9	1	0	2	10	10	0	0·5
June	1016	83	74	86	70	86	71	9	5	2·1	5	0	0	0	2	14	80	4	0	0	0	0	0	50	45	3	1	0	1	11	12	0	0
July	1017	82	72	85	69	87	69	12	4	1·1	4	0	0	0	1	12	84	3	0	0	0	0	1	54	43	2	0	0	0	10	12	0	0
August	1017	83	72	86	69	86	68	11	4	1·2	5	0	0	1	5	15	72	5	0	2	0	0	1	58	40	1	0	0	0	9	13	0	0
September	1016	84	72	90	69	85	67	12	4	1·6	6	0	0	2	13	21	54	5	0	5	0	0	0	59	36	3	1	0	1	7	13	0	0·1
October	1014	86	73	92	70	82	69	14	3	2·6	7	0	2	7	24	24	29	5	1	8	1	2	2	50	36	3	1	1	4	5	11	0	0·1
November	1012	89	75	94	72	82	73	12	4	6·7	11	5	10	8	16	14	20	7	2	18	4	8	5	21	26	17	6	4	9	4	7	0	0·1
December	1011	89	76	93	73	83	73	8	6	5·5	13	33	22	6	3	3	8	4	6	15	14	24	9	6	12	8	5	10	12	5	6	0	0
Means	1013	86	75	98*	68**	85	71	—	—	—	—	12	9	3	6	12	44	5	2	7	6	8	3	32	30	7	3	7	4	7	10	—	—
Totals	—	—	—	—	—	—	—	114	67	55·5	105	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0	2
Extreme values	—	—	—	102†	67††	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of years' observations	16	21				20		7		21		14																				14	10

Standard of time: 45° E. meridian.

* Mean of highest each year.
** Mean of lowest each year.

† Highest recorded temperature.
†† Lowest recorded temperature.

Authorities:—MS. data supplied by East African Meteorological Department, Nairobi.

METEOROLOGICAL OFFICE,
AIR MINISTRY.

PLACE—TANGA. LAT. 5° 7′ S., LONG. 39° 7′ E. Height above Mean Sea Level, 50 feet approx.

Climatic Table compiled from 4 to 22 Years' Observations, 1892 to 1938.

MONTH	PRESSURE at M.S.L.	AIR TEMPERATURE Mean of				Relative humidity		SKY No. of days (estimated)		RAIN		WIND DIRECTION																		Mean wind force Beaufort scale		No. of days with wind force 8 or more	No. of days with fog ‡
												0600–0800									1400–1600												
												Percentage of observations from									Percentage of observations from												
	Mean	Daily max.	Daily min.	Highest in each month	Lowest in each month	0600 -0700	1400	Clear: < 2 oktas	Cloudy: > 6 oktas	Average fall	No. of days with 0·1 in. or more	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	0600 -0700	1400		
	mb.	° F.	° F.	° F.	° F.	%	%			in.																							
January . .	1011	88	76	91	74	87	73	10	5	1·6	3	28	39	10	8	2	0	0	8	5	11	50	23	11	3	1	0	1	0	1·8	3·6	0·7	0
February . .	1011	89	76	92	73	88	70	10	5	1·9	3	25	36	12	4	3	2	1	11	6	10	49	28	10	2	0	0	1	0	1·5	3·4	0·3	0
March . . .	1011	89	76	93	72	90	69	9	6	3·7	7	9	19	8	13	15	8	5	10	13	6	25	21	26	13	6	0	1	2	1·3	2·9	0	0
April . . .	1012	88	75	92	72	93	76	5	9	10·5	12	1	3	2	20	46	16	3	1	8	0	2	4	37	41	12	2	0	2	1·4	2·5	0	0
May . . .	1015	85	73	88	71	92	75	4	10	12·0	12	1	0	0	19	51	22	1	0	6	0	0	0	29	53	15	0	0	3	1·6	2·5	0	0
June . . .	1017	83	71	87	68	91	68	8	6	2·5	5	0	0	0	19	45	30	2	0	4	0	0	0	34	51	14	1	0	0	1·5	3·1	0	0
July . . .	1017	83	70	85	67	92	72	7	7	4·7	5	0	0	0	21	46	25	6	0	2	0	0	0	39	44	16	1	0	0	1·6	2·8	0	0
August . .	1017	83	69	86	67	93	71	7	7	2·9	6	0	0	0	29	46	19	2	0	4	0	0	0	42	42	14	1	0	1	1·5	2·6	0	0
September .	1016	83	70	87	67	93	69	9	6	3·0	6	0	0	2	39	40	15	2	0	2	0	0	2	54	36	8	0	0	0	1·4	2·8	1	0
October . .	1015	85	71	88	68	92	68	10	5	3·9	7	0	0	8	45	33	9	2	3	5	0	2	8	58	32	5	0	0	0	1·4	3·3	1	0
November .	1014	88	73	90	69	92	74	8	6	7·5	9	3	8	9	42	20	6	2	3	7	1	11	16	51	17	4	0	0	0	1·4	3·0	0·3	0
December . .	1012	89	75	91	71	90	73	10	5	2·4	5	20	32	15	15	5	3	1	5	4	4	33	32	24	4	1	0	2	0	1·8	3·6	0·5	0
Means . . .	1014	86	73	93*	66**	91	71	—	—	—	—	7	11	4	23	29	13	3	4	6	3	14	11	34	28	8	0	1	1	1·5	3·0	—	—
Totals . . .	—	—	—	—	—	—	—	97	77	56·6	80	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	0
Extreme values	—	—	—	95†	60††	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of years' observations	10	7				9–11		9–12		20-21	15–17																			10–12		4–6	5–7

Standard of time: 37½° E. meridian.

* Mean of highest each year.
** Mean of lowest year.

† Highest recorded temperature in 21 years' observations.
†† Lowest recorded temperature in 22 years' observations.

‡ Undefined.

Authorities :—MS. data supplied by B.E.A. Meteorological Service, Nairobi.
Berlin, Mitteilungen aus den deutschen Schutzgebieten.

METEOROLOGICAL OFFICE,
AIR MINISTRY.

PLACE—MOMBASA. LAT. 4° 3′ S., LONG. 39° 39′ E. Height above Mean Sea Level, 52 feet.

Climatic Table compiled from 5 to 46 Years' Observations, 1891 to 1945.

MONTH	PRESSURE at M.S.L.	AIR TEMPERATURE Mean of				Relative humidity		SKY No. of days (estimated)		RAIN	
	Mean	Daily max.	Daily min.	Highest in each month	Lowest in each month	0830	1430	Clear: < 2 oktas	Cloudy: > 6 oktas	Average fall	No. of days with 0·1 in. or more
	mb.	° F.	° F.	° F.	° F.	%	%			in.	
January	1010	89	76	92	73	76	66	8	6	1·1	8
February	1009	90	76	93	74	75	63	9	5	0·7	1
March	1009	90	77	93	74	77	63	10	5	2·5	4
April	1010	88	76	92	73	81	71	8	7	7·4	9
May	1013	84	74	85	71	85	76	3	12	12·5	14
June	1015	83	73	86	70	82	72	6	9	4·7	9
July	1016	82	71	84	68	82	72	5	9	3·8	8
August	1016	82	71	85	68	76	72	5	9	2·4	7
September	1015	83	72	86	69	81	70	7	7	2·6	7
October	1013	85	74	87	70	79	69	9	5	3·2	5
November	1011	87	75	90	72	78	69	10	5	3·9	5
December	1010	88	76	92	73	78	69	7	7	2·5	5
Means	1012	86	74	94*	68**	79	70	—	—	—	—
Totals	—	—	—	—	—	—	—	87	86	47·3	77
Extreme values	—	—	—	96†	61††	—	—	—	—	—	—
No. of years' observations	7	17–19		11–12		14		7		46	24-26

MONTH	WIND DIRECTION 0830 Percentage of observations from								
	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm
January	25	10	2	3	2	1	10	41	6
February	27	6	1	2	3	8	11	36	6
March	11	10	5	6	10	8	15	15	20
April	1	1	0	19	24	37	11	1	6
May	0	0	1	4	24	50	16	1	4
June	0	0	0	3	31	40	17	5	4
July	0	0	0	12	29	36	18	4	1
August	0	0	0	10	35	39	13	0	3
September	0	0	0	10	45	38	4	1	2
October	1	0	0	20	42	22	7	1	7
November	2	3	6	24	19	11	7	5	23
December	15	8	7	6	3	5	5	25	26
Means	7	3	2	10	22	25	11	11	9
Totals	—	—	—	—	—	—	—	—	—
Extreme values	—	—	—	—	—	—	—	—	—
No. of years' observations	7								

MONTH	WIND DIRECTION 1430 Percentage of observations from									Mean wind speed		No. of days with wind speed 33 knots or more	No. of days with fog
	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	0830	1430		
										knots	knots		
January	3	37	37	12	2	3	3	3	0	3	11	0	—
February	2	31	42	16	7	1	1	0	0	3	10	0	—
March	0	15	37	30	16	1	1	0	0	3	9	0	—
April	0	0	2	23	52	17	5	0	1	3	8	0	—
May	0	0	0	6	51	36	7	0	0	4	7	0	—
June	0	0	1	3	46	37	11	2	0	5	10	0	—
July	0	0	0	2	70	27	1	0	0	5	9	0	—
August	0	0	0	5	72	18	5	0	0	4	9	0	—
September	0	0	0	18	63	15	3	0	1	5	8	0	—
October	0	0	1	22	54	18	3	1	1	4	8	0	—
November	0	0	15	46	31	7	0	0	1	3	8	0	—
December	1	9	33	25	13	8	2	0	14	4	8	0	—
Means	1	8	14	17	40	15	3	1	1	4	9	—	—
Totals	—	—	—	—	—	—	—	—	—	—	—	0	—
Extreme values	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of years' observations	5									6		7	—

Standard of time: 45° E. meridian.

* Mean of highest each year.
** Mean of lowest each year.

† Highest recorded temperature } in 28–29 years' observations.
†† Lowest recorded temperature } in 28–29 years' observations.

Authorities:—MS. data supplied by B.E.A. Meteorological Service, Nairobi.

B.E.A. Meteorological Service, Collected Climatological Statistics for East African Stations, Nairobi 1952.

METEOROLOGICAL OFFICE,
AIR MINISTRY.

PLACE—MOGADISCIO. LAT. 2° 1′ N., LONG. 45° 20′ E. Height above Mean Sea Level, 39 feet.

Climatic Table compiled from 5 to 22 Years' Observations, 1922 to 1950.

MONTH	PRESSURE at M.S.L.	AIR TEMPERATURE Mean of				Relative humidity		SKY No. of days		RAIN		WIND DIRECTION																		Mean wind force Beaufort scale		No. of days with wind force 8 or more	No. of days with visibility less than ½ n. mile
	Mean	Daily max.	Daily min.	Highest in each month	Lowest in each month	0830	1430	Clear: <2 oktas	Cloudy: > 6 oktas	Average fall	No. of days with 0·04 in. or more	Percentage of observations from									Percentage of observations from									0830	1430		
												N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm				
	mb.	° F.	° F.	° F.	° F.	%	%			in.																							
January . .	1011	85	74	89	70	78	75	8	0·7	0	0	3	61	34	1	0	0	0	0	1	0	24	74	2	0	0	0	0	0	3	4	0	—
February . .	1011	86	74	88	70	76	72	5	0·5	0	0	0	47	52	1	0	0	0	0	0	0	12	86	2	0	0	0	0	0	3	4	0	—
March . . .	1011	88	76	90	72	76	73	2	1	0·1	0	0	25	61	14	0	0	0	0	0	0	7	77	16	0	0	0	0	0	2	3	0	—
April . . .	1011	89	78	91	73	77	74	0·3	3	2·3	3	1	3	25	33	25	9	3	1	0	0	0	26	33	32	8	1	0	0	2	2	0	—
May . . .	1011	88	77	90	73	82	78	0	3	2·3	4	1	0	0	1	25	56	13	4	0	0	0	1	1	38	57	3	0	0	3	3	0	—
June . . .	1013	85	75	88	71	82	77	0·4	8	3·8	11	0	0	0	0	8	82	9	1	0	0	0	0	0	7	90	3	0	0	3	4	0	—
July . . .	1013	83	73	86	70	84	79	0·1	9	2·5	9	0	0	0	0	14	81	5	0	0	0	0	0	0	9	91	0	0	0	3	4	0	—
August . .	1014	83	73	84	69	85	80	0·6	7	1·9	6	0	0	0	1	14	81	3	1	0	0	0	0	0	14	85	1	0	0	3	3	0	—
September .	1013	84	74	86	70	84	79	1	2	1·0	3	0	0	0	1	21	77	1	0	0	0	0	0	1	13	86	0	0	0	3	4	0	—
October . .	1013	85	75	87	71	83	78	0·7	1	0·9	1	0	1	5	14	50	30	0	0	0	0	1	2	15	46	35	1	0	0	2	3	0	—
November .	1012	86	75	88	71	80	78	0·6	1	1·6	3	4	26	43	17	6	2	1	0	1	0	13	50	27	8	2	0	0	0	2	3	0	—
December . .	1011	87	75	89	71	79	76	2	3	0·5	0·6	7	51	40	0	0	0	1	1	0	1	30	67	1	0	0	1	0	0	3	4	0	—
Means . . .	1012	86	75	92*	67**	81	77	—	—	—	—	1	18	22	7	13	35	3	1	0	0	7	32	8	14	38	1	0	0	3	3	—	—
Totals . . .	—	—	—	—	—	—	—	21	39	16·9	41	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0	—
Extreme values	—	—	—	94†	59††	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of years' observations	5–7	6–7								21-22		6–7																		6		5–6	

Standard of time: 45° E. meridian.

* Mean of highest each year.
** Mean of lowest each year.

† Highest recorded temperature.
†† Lowest recorded temperature.

Authorities:—MS. data in M.O.

METEOROLOGICAL OFFICE,
AIR MINISTRY.

CHAPTER II

ROBBEN ISLAND TO CAPE AGULHAS

Charts 636, 1920.

CAPE PENINSULA.—Aspect.—Table mountain.—(A description of the Cape peninsula, Table bay, False bay and Simons bay is also contained in Africa Pilot, Volume II). The Cape peninsula is a remarkable promontory extending in a southerly direction for about 28 miles from Green point at its northern end to the Cape of Good Hope (*Lat. 34° 21′ S., Long. 18° 28′ E.*) its southern extremity. It is connected to the mainland on its north-eastern side by a neck of low-lying land, about 11 miles wide between the head of Table bay and False bay. In height, the peninsula varies from 3,563 feet (1,086^{m}0) at Table mountain, 3,045 feet (928^{m}1) at Constantiaberg, both in its northern portion, and 2,225 feet (678^{m}2) at Zwartkop, in its southern part, to but a few feet near its centre where a valley which is only visible on certain bearings, extends from Chapmans bay, on its western side, to Fishhoek bay, on its eastern side.

The Cape peninsula is rocky and barren, with a growth of stunted trees here and there. Large areas, however, have been planted with pine and other trees, and with the fertile valleys in the vicinities of Constantia and Wynberg, on its eastern side, are pleasing exceptions. From westward, the peninsula appears high and rugged from Table mountain to within 4 miles of the Cape of Good Hope, where the mountain chain terminates in Paulsberg, 1,210 feet (368^{m}8) high and situated close to the western shore of False bay (page 95). From Paulsberg to Cape point, the south-eastern extremity of the Cape of Good Hope, the land is elevated and, except for two peaks at its southern end, is even ; these two peaks appear, when seen from a considerable distance, as a saddle-shaped island. *See* views on Chart 636.

Table mountain (*Lat. 33° 58′ S., Long. 18° 25′ E.*) is a remarkable and gigantic mass of quartzose sandstone at the northern end of the peninsula, immediately overlooking Cape Town at the head of Table bay. The mountain, which rests on a granite base, 500 feet (152^{m}4) high, has a level summit from which its north-eastern side falls almost perpendicularly to a gap which separates it from Devil's peak, a rugged mountain, 3,281 feet (1,000^{m}0) high. Eastward of these two mountains, lies the low sandy isthmus between Table and False bays. The north-western side of Table mountain also falls nearly perpendicularly from its summit, and then slopes steeply to the base of Lion's Head, a conical mountain, 2,193 feet (668^{m}4) high, which in some places is so steep that it can only be ascended by steps cut in the rock ; *see* views facing pages 82 and 83.

Charts 2091, 2082, 578, 2095, 1013, 596, 2202a, 748a, 2203, 2127, 2483.

Charts 636, 1920.

There is an aerial cableway connecting an upper and lower station, on the north-western side of Table mountain; the upper station, situated about 1½ miles south-south-westward of Lion's Head, is conspicuous.

From the northern side of Lion's Head, a rounded ridge extends about 1¼ miles in a north-easterly direction to Lion's Rump, which has a flagstaff and two masts on its summit, where it rises again to an elevation of 1,153 feet ($351^{m}4$). *See* views facing this page and page 83, and on chart 2091.

The Twelve Apostles is a high serrated, mountainous ridge from 2,400 to 3,000 feet ($731^{m}5$ to $914^{m}4$) high, extending in a south-south-westerly direction from the south-western side of Table mountain towards Hout bay, on the western side of the peninsula. This ridge presents a steep precipitous face seaward and ends at a remarkable conical hill, 1,430 feet ($435^{m}9$) high, named Little Lion's Head, which is similar in appearance to Lion's Head, but has a very conspicuous white sand patch showing both northward and southward over Hout bay. At about 2 miles farther south-south-westward a lofty rugged hill named Karbonkelberg, rises to an elevation of 2,144 feet ($653^{m}5$), and is separated by a saddle-shaped ridge from Hangberg, a remarkable hill, 1,087 feet ($331^{m}3$) high, which overhangs the western entrance point of Hout bay, *see* page 91.

Local magnetic anomaly.—A local magnetic anomaly, details of which are lacking, has been reported from time to time off Cape Peninsula.

Chart 1920.

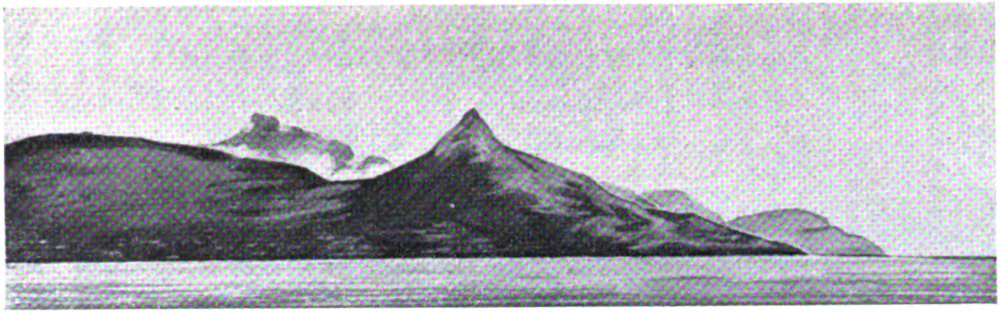
TABLE BAY AND APPROACHES.—Robben island.—Harbour.—This island is situated with its southern extremity about 5 miles northward of Green point, the northern end of Cape Peninsula; with its light, it forms an admirable landmark when approaching Table bay from the northward. It is low, flat and fringed with reefs, which on its western side project about one or 2 cables offshore. Rocky ground, over which the depths range from 4¾ to 11 fathoms ($8^{m}7$ to $20^{m}1$), extends westward from the island for from one-half to three-quarters of a mile. This rocky ground rises suddenly from depths of 25 to 30 fathoms ($45^{m}7$ to $54^{m}9$), and the sea breaks heavily on it during strong onshore winds.

The north-eastern side of the island is free from dangers, but its eastern and southern coasts are fronted by rocky ground, marked by seaweed, with irregular depths over it of from 2 to 4 fathoms ($3^{m}7$ to $7^{m}3$), for a distance of from 2 to 4 cables offshore.

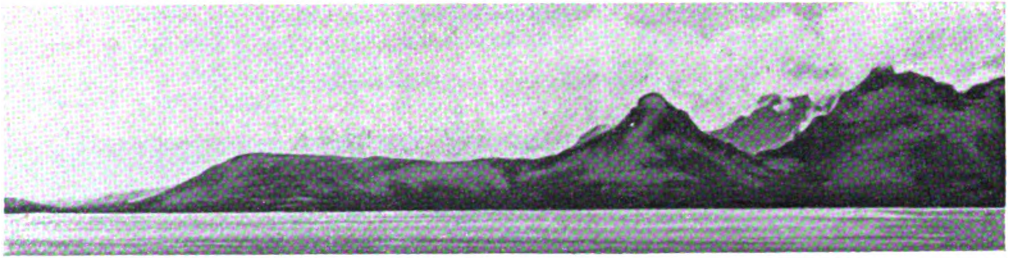
Depths of less than 5 fathoms ($9^{m}1$) lie at a distance of from 9 to 12 cables from the eastern and southern sides of the island.

The navigable channel eastward of Robben island lies between the 5-fathom ($9^{m}1$) line off Robben island and the 7-fathom ($12^{m}8$) line off Blaauwbergstrand, about 4 miles eastward of Robben island. Care must be taken to avoid the reefs lying north-westward of Blaauwbergstrand (*Lat. 33° 48′ S., Long. 18° 28′ E.*), *see* page 84. Less water has been reported eastward of Robben island and vessels drawing more than 20 feet ($6^{m}1$) are advised not to pass between Robben island and the mainland.

Charts 636, 2091, 2082, 578, 2095, 1013, 596, 2202a, 748a, 2203, 2127, 2483.

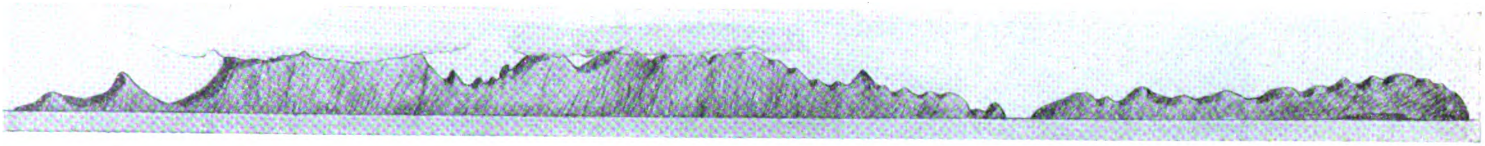

Lion's Rump.
Table mountain (summit obscured).
Lion's Head, bearing 191°, distant 3 miles.

Northern end of Cape peninsula from northward.
(*Original dated* 1918.)

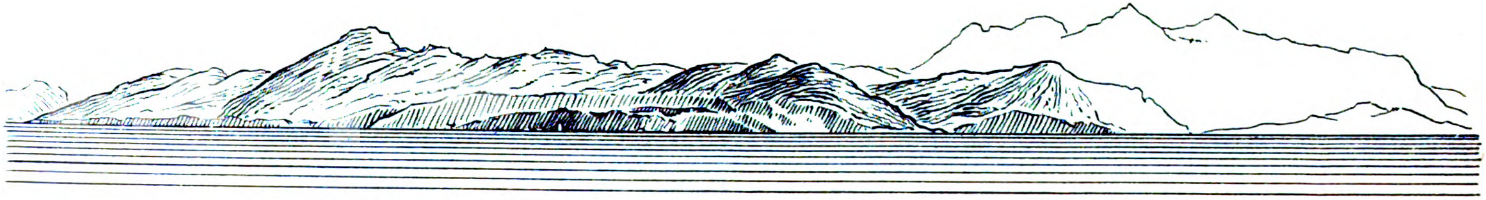

Lion's Rump.
Lion's Head, bearing 138°, distant 4 miles.
Table mountain (summit obscured).

Northern end of Cape peninsula from westward.
(*Original dated* 1918.)

To face page 83.


Lion's Rump.
Lion's Head.
Table mountain (summit obscured), bearing 079°, 23 miles.
Twelve Apostles.
John.
Little Lion's Head (obscured), bearing 086°.
Chapmans peak.
Little Slangkop.
Slangkop point, bearing 111°

Northern end of Cape peninsula from westward.
(*Original dated* 1920.)


Peak 1,200 feet.
Slangkop lighthouse, bearing 099°, distant 8·2 miles.
Conspicuous sand patch.

Slangkop point and adjacent coast.
(*Original dated* 1936.)

Chart 1920.

Two breakwaters form a small harbour in Murray's bay on the north-eastern side of the island.

Dangers.—Whale rock lying about one mile south-south-eastward of the southern extremity of Robben island, usually breaks; it has a depth of less than 6 feet ($1^{m}8$) over it. The rock is covered by the *red* sector of Robben Island light between the bearings of 340° and 351°.

Between the rock and the island there is a passage in the fairway of which the depths are from 5½ to 7 fathoms ($9^{m}6$ to $12^{m}8$), over a rocky bottom; but this channel should never be attempted by low-powered vessels, except in a case of emergency, as the currents in the vicinity of the rock are sometimes strong and uncertain in their directions.

A rock, marked by kelp and on which the depth is about 8 feet ($2^{m}4$), lies about 2 cables east-north-eastward of the head of the jetty at the south-eastern end of Robben island.

There are several detached shoals with depths over them of from 31 to 33 feet ($9^{m}4$ to $10^{m}1$), about one mile north-eastward, eastward and south-eastward, respectively, from this same jetty.

Lights.—Fog signals.—Radiobeacon.—A light is exhibited at an elevation of 154 feet ($46^{m}9$), from a white circular tower, 60 feet ($18^{m}3$) in height, situated on Minto hill (*Lat. 33° 49′ S., Long. 18° 22′ E.*) near the southern end of Robben island.

A fog signal is sounded from a station near the western side of Robben island. A radiobeacon transmits from the lighthouse.

A light is occasionally exhibited at an elevation of 8 feet ($2^{m}4$) from the head of the northern breakwater in Murray's bay.

A light is occasionally exhibited at an elevation of 10 feet ($3^{m}0$) from the head of the southern breakwater.

A fog signal is occasionally sounded from a position close to the light-structure on the southern breakwater.

Robben island lighthouse is in telephonic communication with Cape Town.

Life-saving.—A line-throwing apparatus is maintained on Robben island.

Anchorage.—Fair anchorage, sheltered from south-westerly to west-north-westerly winds, may be obtained off the north-eastern side of Robben island. The best position for a vessel of moderate draught is with the south-eastern extremity of Robben island bearing 213° and the northern extremity of the island bearing 293°; in this position the depths are from 7 to 8 fathoms ($12^{m}8$ to $14^{m}6$), sand. Smaller vessels will find excellent shelter, nearer the island, in depths of from 5 to 6 fathoms ($9^{m}1$ to $11^{m}0$), but closer in the bottom is rocky.

There is a jetty on the south-eastern side of Robben island, but landing is difficult at times owing to the swell; good landing may be obtained in Murray's bay, on the north-eastern side of the island, with depths of 13 to 15 feet ($4^{m}0$ to $4^{m}6$), alongside the quay. Depths of 13 feet ($4^{m}0$) exist off the entrance to the harbour.

Robben island is under the control of the Union Defence Force. Permits are required to land.

Table bay.—Lights.—This bay is situated on the northern side of the neck of the Cape peninsula, and affords shelter for a large number of vessels with fair security during the summer months, October to April.

The description of the coast northward of Blaauwberg, a dark hill

Charts 636, 2091, 2082, 578, 2095, 1013, 596, 2202a, 748a, 2203, 2127, 2483.

Chart 1920.

situated 1¼ miles inland, and about 9 miles north-north-eastward of Green point, will be found in Africa Pilot, Volume II. Reefs extend three-quarters of a mile north-westward from Blaauwbergstrand, and up to half a mile offshore. Southward of Blaauwberg, the coast consists of a series of sand dunes, from 50 to 150 feet ($15^{m}2$ to $45^{m}7$) high, which are sparsely covered with scrub and low bush ; and, for about the first 3 miles is fringed by rocks and breakers, which, abreast of the village of Blaauwbergstrand, situated 2½ miles south-south-westward of Blaauwberg, extend about 4½ cables offshore. Southward of these rocks, the coast forming the eastern side of Table bay curves south-south-eastward and then south-south-westward for about 8 miles to the mouth of Salt river. The whole of this part of the coast is very deceptive, particularly at night or in hazy weather, owing to the close resemblance which the sandy shore bears to the sea.

A wreck, with parts of the hull showing, lies close offshore about 13 cables northward of the mouth of Diep river, situated about 2 miles north-eastward of the mouth of Salt river ; and a similar wreck lies close off-shore, about 3½ cables north-eastward of the mouth of Salt river.

The masts of the radio station at Milnerton, which are 300 feet ($91^{m}4$) high, are situated about 1½ miles north-eastward of the mouth of Diep river, and are conspicuous. *Red* lights are exhibited from the tops of these masts.

A conspicuous building is situated 3 cables east-north-eastward of the mouth of Salt river.

A conspicuous tower, part of Groote Schuur hospital, is situated 14 cables southward of the mouth of Salt river.

From the mouth of Salt river, the shore of Table bay sweeps round westward and north-westward to Mouillé point, and on it is situated the city of Cape Town with its docks, etc.

Granger bay is contained between Mouillé point and the breakwater, 6 cables eastward.

Green point (*Lat. 33° 54′ S., Long. 18° 24′ E.*) is situated about three-quarters of a mile westward of Mouillé point, and from it shoal water extends about 2 cables in a north-westerly direction.

The outer end of a sewage outfall, which extends in a north-westerly direction for about 2¼ cables from the shore, is situated about 3 cables north-north-westward of Green point.

Cautions.—*Cable.*—Vessels are warned not to anchor between two pecked lines shown on chart 1920 extending in a 316° direction from Green point, owing to the existence of submarine cables. *See* page 30.

Charts 1920, 636.

Dumping ground.—Hulks have been sunk and explosives dumped within a radius of 4 miles of a position about 5½ miles south-westward of Robben island ; vessels are cautioned against anchoring or trawling in this area which is indicated by pecked lines on the chart.

Chart 1920.

Dangers.—**Buoyage.**—The coast between the mouths of Diep and Salt rivers is fronted in places by foul ground on which the sea breaks heavily after north-west gales. Shoals, with depths of 25 to 35 feet ($7^{m}6$ to $10^{m}7$) over them, lie between 6 and 9½ cables north-westward to west-south-westward of the entrance to Diep river.

Charts 636, 2091, 2082, 578, 2095, 1013, 596, 2202a, 748a, 2203, 2127, 2483.

Chart 1920.

Midway between the mouths of Diep and Salt rivers, depths of 6 fathoms ($11^{m}0$) exist, in some cases more than 5 cables offshore.

A rocky shoal of small extent, with a depth of 27 feet ($8^{m}2$) over it, lies about 8 cables northward of the mouth of Salt river and 6 cables offshore; a red can buoy is moored close northward of the shoal.

A shoal, with a depth of 35 feet ($10^{m}7$) over it, lies about 4½ cables farther north-westward.

Charts 123, 1920.

A rocky shoal, with a depth of 37 feet ($11^{m}3$) over it, lies in the approach to Victoria basin about 7 cables east-north-eastward of the light-structure on the head of Table Bay breakwater (*Lat. 33° 54′ S., Long. 18° 26′ E.*); vessels should avoid this position especially in bad weather and heavy swells.

A conical light-and-bell buoy painted red, and exhibiting a *white occulting* light *every four seconds*, light *two seconds*, eclipse *two seconds*, is moored about one cable westward of this shoal and 6½ cables east-north-eastward of the head of Table Bay breakwater; an automatic bell, giving *four* strokes *every minute*, is sounded from the buoy. Vessels may pass on either side of this buoy having due regard to the depths on this shoal and the state of the swell.

Depths of less than 6 fathoms ($11^{m}0$) lie to the eastward of a position about 7½ cables east-south-eastward of the head of the breakwater.

A patch, with a depth of 35 feet ($10^{m}7$) over it, lies in a position 7½ cables south-eastward of the head of the breakwater.

Lights.—Fog Signal.—A light is exhibited at an elevation of 65 feet ($19^{m}8$) from a square tower, the top part of which is painted black with a yellow band, yellow dome, and the lower part grey, 52 feet ($15^{m}8$) in height, situated on Green point.

A fog signal is sounded from Green Point lighthouse.

A light, for the use of aircraft, is occasionally exhibited, at an elevation of 107 feet ($32^{m}6$), at Cape Town airport, situated about 2½ miles south-south-eastward of Milnerton radio station.

Caution.—Vessels approaching Table bay are warned that *red* and *green* robot traffic lights may be visible from seaward in the Sea Point and Three Anchor Bay areas, and care should be taken not to mistake these lights for navigational aids.

Tidal stream.—Current.—There is no sensible tidal stream either in Table bay or off the adjacent coast.

A current, varying from half a knot to 2 or 3 knots, sets northward past Table bay and Robben island (*Lat. 33° 49′ S., Long. 18° 22′ E.*), but in the winter months, during the occurrence of north-westerly winds, a current sets into Table bay from north-westward, and impinging on the south-eastern shore of the bay, about the mouth of the Salt river, divides into two streams, one setting northward along the coast and out between Robben island and the coast westward of Blaauwberg, while the other takes a westerly direction as far as Eastern mole of Duncan basin, then northerly, sweeping the south-western shore of the bay.

During the summer season it has been observed, particularly during South-easters, that a weak current sets round Mouillé point south-eastward into the bay, and out abreast the coast westward of Blaauwberg beach as in winter.

Anchorage.—Vessels anchoring in Table bay must do so clear of the

Charts 636, 2091, 2082, 578, 2095, 1013, 596, 2202a, 748a, 2203, 2217.

Charts 123, 1920.

entrances to Victoria and Duncan basins. During the winter months, from April to September, when northerly and north-westerly winds prevail, there is no safe anchorage in the bay, and it should only be used by vessels prepared to proceed to sea at short notice on the approach of bad weather.

Vessels anchoring in the bay during summer months, October to March, should anchor to the eastward of the end of the breakwater, as south-easterly winds reach gale force, and vessels, particularly light-draught vessels, may drag their anchors.

Vessels at anchor should at all times have their main engines ready at short notice.

Charts 123, 1920, 636.

Directions.—*Power vessels.*—By night, from northward, a vessel should pass about 2½ miles westward of Robben Island light, and steer for the light near the outer end of the breakwater, bearing about 132°, which leads about one mile south-westward of Whale rock (*Lat. 33° 50′ S., Long. 18° 23′ E.*).

The end of the breakwater should be rounded at a distance of not less than 3 cables, and thence a vessel may proceed into either of the basins or to the anchorage south-eastward of the breakwater.

From southward, vessels should pass Slangkop point, *see* page 92, at a distance of about 5 miles and should not bring the light on that point to bear more than 154° until Robben Island light bears 023°, when this latter may be approached on that bearing; this light will be seen before the light on Green point. When Green point light bears 063° course may be altered to pass at least 1¼ miles northward of Green and Mouillé points; after passing the latter point, a vessel may steer so as to round the outer end of the breakwater at a distance of not less than 3 cables, and thence proceed into either of the basins or to the anchorage south-eastward of the breakwater.

Caution.—At night or in hazy weather, vessels standing into the bay should never fail to sound. For want of this precaution vessels have run upon Green and Mouillé points without seeing land, whilst their masts were seen over a fog from the elevated ground at the foot of Lion's Rump. The fogs that obscure the light are frequently confined to the low ground in the vicinity of Green and Mouillé points, extending upwards only for 100 to 150 feet ($30^{m}5$ to $45^{m}7$). In these circumstances it is advisable to have a mast-head man aloft, who will probably see land when it is invisible from the deck

Pilotage.—The employment of a pilot is compulsory for merchant vessels when entering, leaving, or shifting berth in the basins or docks at Cape Town.

Charts 123, 1920.

Port limits.—The area bounded by the following limits is under the control of the South African Railways and Harbours Administration, *see* page 36.

On the west by a line joining Green Point and Robben Island lighthouses. On the north by a line drawn 090° from Robben Island lighthouse to the shore of Table bay, thence southward along the high-water line so as to include the foreshore to the Castle, and thence back to Green Point lighthouse, together with the foreshore, wharves, docks, basins, jetties, piers, harbour works, and all harbour and dock lands vested in the Government of the Union of South Africa.

Charts 2091, 2082, 578, 2095, 1013, 596, 2202a, 748a, 2203, 2217.

Chart 123.

Breakwater.—Light.—Fog signal.—A breakwater projects from a position on the coast about half a mile south-eastward of Mouillé point; it extends in a north-easterly and east-north-easterly direction for about three-quarters of a mile.

A light is exhibited, at an elevation of 46 feet ($14^{m}0$), from a steel framework structure near the head of the breakwater (*Lat. 33° 54′ S., Long. 18° 26′ E.*).

A fog signal is sounded from a station near the head of the breakwater.

Signal station.—A signal station, about 130 feet ($39^{m}6$) high, is situated on the top of the silos or bins of the grain elevator above No. 1a or Cross berth, at the south-western end of Victoria basin, *see* below. It is equipped for semaphore and flag signalling by day, for morse signalling at night, and is also fitted with radio. Constant watch is kept, and the station is in telephonic communication with the Port Captain's office.

Victoria basin.—Lights.—This basin is protected on its northern side by the breakwater and by East pier, which extends at right angles to the former from a position about 600 yards ($548^{m}6$) from its root. On its southern and eastern sides, it is enclosed by South Arm and South Arm elbow (*Lat. 33° 54′ S., Long. 18° 26′ E.*). The entrance, between the heads of East pier and South Arm elbow, is about 250 feet ($76^{m}2$) wide.

Two lights, disposed vertically, are exhibited at elevations of 22 and 18 feet ($6^{m}7$ and $5^{m}5$), respectively, from a framework mast on a concrete pillar, on each side of the entrance to Victoria basin.

The depths in the basin varied, in 1951, from about 37 feet ($11^{m}3$) in the entrance, to 10 feet ($3^{m}0$) at No. 4 quay.

In 1951, Victoria basin, which has an area of 67 acres, contained a total length of quayage of 9,405 feet ($2,866^{m}6$) and consisted of the following:—

No. 1 jetty projects at right angles to the south-eastern side of the breakwater near its root, and is a wooden structure with depths of from 20 to 23 feet ($6^{m}1$ to $7^{m}0$) on its south-western side, and from 18 to 20 feet ($5^{m}5$ to $6^{m}1$) on its north-eastern side.

No. 2 jetty projects at right angles to the south-eastern side of the breakwater, about mid-way between No. 1 jetty and the East pier; it has depths alongside of from 35 to 37 feet ($10^{m}7$ to $11^{m}3$), and is equipped for the discharge of fuel oil from tank vessels.

The Collier jetty projects in a north-easterly direction from the land in the south-western corner of the basin, and has depths of from 24 to 32 feet ($7^{m}3$ to $9^{m}8$) on its south-eastern side, and from 20 to 31 feet ($6^{m}1$ to $9^{m}4$) on its north-western side. This jetty is equipped, on its south-eastern side, with appliances for loading grain in bulk.

The Fish quay extends north-north-westward from the root of Collier jetty for a distance of 310 feet ($94^{m}5$), and has a least depth of 8 feet ($2^{m}4$).

South Arm quay is the north-western side of South pier, and has depths alongside of from 26 to 31 feet ($7^{m}9$ to $9^{m}4$).

Elbow quay is the south-western side of the arm at right angles to South arm, and has depths alongside of from 32 to 34 feet ($9^{m}7$ to $10^{m}4$). This quay is equipped for the discharge of petrol and oil from tank vessels.

Charts 1920, 636, 2091, 2082, 578, 2095, 1013, 596, 2202a, 748a, 2203, 2127, 2483.

Chart 123.

No. 4 quay, at the north-western end of the south-western side of the basin, is in two sections and has a depth alongside of 10 feet ($3^{m}0$).

No. 5 quay, between No. 4 quay and No. 1 jetty, has depths alongside of from 14 to 23 feet ($4^{m}3$ to $7^{m}0$).

No. 6 quay, between Nos. 1 and 2 jetties, has depths alongside of from 27 to 34 feet ($8^{m}2$ to $10^{m}4$).

No. 7 quay, between No. 2 jetty and East pier, has depths alongside of 37 feet ($11^{m}3$).

East Pier quay, on the south-western side of East pier (*Lat. 33° 54′ S., Long. 18° 26′ E.*), has depths alongside of 35 feet ($10^{m}7$).

Cross Berth wharf, between Collier jetty and the south-western end of South arm, has depths alongside of from 20 to 21 feet ($6^{m}1$ to $6^{m}4$).

Alfred basin.—The entrance to this basin, 90 feet ($27^{m}4$) wide, is situated nearly in the centre of the south-western side of Victoria basin. The depths in Alfred basin vary from 21 feet ($6^{m}4$) at its entrance to between 18 to 24 feet ($5^{m}5$ to $7^{m}3$) within it.

The area of Alfred basin is 8½ acres, with a total length of 2,632 feet ($802^{m}3$) of wharfage.

West quay is on the western side of the basin, and has depths alongside of from 22 to 24 feet ($6^{m}7$ to $7^{m}3$). The floating dock lies alongside the northern portion of this quay, *see* page 89.

North quay is on the northern side of the basin and has depths of 24 feet ($7^{m}3$) alongside. The entrance to Robinson dry dock lies close westward of North quay (*Lat. 33° 55′ S., Long. 18° 25′ E.*), *see* page 89.

South quay, on the southern side of the basin, has a depth alongside of 18 feet ($5^{m}5$).

East quay is on the eastern side of the basin and is in four sections, Nos. 1, 2, 3 and 4, and has depths alongside of from 19 to 23 feet ($5^{m}8$ to $7^{m}0$).

Duncan basin. — Lights. — Depths. — Berths. — Duncan basin, south-eastward of Victoria basin, is an enclosed area of 290 acres, about one mile in length and 3½ cables in width, with a total quayage of 12,643 feet ($3{,}853^{m}6$), in 1951.

The entrance, which is 400 feet ($121^{m}9$) wide, is situated near the northern end of its north-eastern side.

A light is exhibited at an elevation of 26 feet ($7^{m}9$) on each side of the entrance.

The depths in the basin vary from about 40 feet ($12^{m}2$) in the entrance to 21 feet ($6^{m}4$) at the south-eastern end of the Eastern mole and at the entrance to the Yacht basin.

Berths A, B and C in the northern corner have depths of 38 feet ($11^{m}6$) alongside. Berth D at the south-western end of South arm has depths of 34 to 38 feet ($10^{m}4$ to $11^{m}6$). Berths C and D are equipped for the discharge of petrol and oil from tank vessels.

Berths E to L, on the south-western side of the basin, have depths of 42 to 34 feet ($12^{m}8$ to $10^{m}4$) alongside.

Berth M, at the south-western end of the south-eastern side of the basin, has a depth of 21 feet ($6^{m}4$).

Nos. 1 to 5 berths, on the inside of New Eastern mole, are dredged to depths of between 21 to 34 feet ($6^{m}4$ to $10^{m}4$).

The entrance to Sturrock Graving dock (*Lat. 33° 55′ S., Long. 18° 27′ E.*), *see* below, lies at the south-eastern side of Duncan basin, and

Charts 1920, 636, 2091, 2082, 578, 2095, 1013, 596, 2202a, 748a, 2203, 2127, 2483.

Chart 123.

close south-westward of this is the entrance to the Yacht basin, which has depths of between 14 and 20 feet ($4^{m}3$ and $6^{m}1$).

General remarks.—The docks and basins are connected to the railway system of the Union, which serves all the quays, piers and jetties except No. 1 jetty, Nos. 4 and 5 quays, Cross berth and Fish quay in Victoria basin ; South quay in Alfred basin ; and M berth in Duncan basin.

All the quays, piers, and jetties are provided with electric cranes except Nos. 4 and 5 quays, No. 1 jetty, Cross berth and Fish quay in Victoria basin ; South quay and East quay in Alfred basin ; and M berth and Eastern mole in Duncan basin.

The cranes are mostly of 3 or 4 tons capacity, but there are five 15-ton cranes ; there is also a floating crane with a capacity of 60 tons.

The grain elevator is situated between East quay in Alfred basin and Cross berth in Victoria basin, and its storage bins are very conspicuous ; there are conveyors from the bins to an overhead gantry on the Collier jetty (*Lat. 33° 55′ S., Long. 18° 25′ E.*).

Scend.—Caution.—Following westerly gales, which occur more frequently during winter months, considerable scend can be experienced in Table Bay Docks. Masters of vessels docking should make full use of the heavy coir springs with which all the berths are equipped and ensure that their vessels are well moored. Off-shore anchors are also provided at certain berths for use as required.

Charts 123, 1920.

Cape Town.—This city is the capital of the Province of Cape of Good Hope, and the seat of the legislature of the Government of the Union of South Africa.

In 1951 the total population of Cape Town, including its suburbs, was 199,450 Europeans and 215,370 coloureds and natives.

In the year 1949-50, a total of 3,365 vessels, with an aggregate gross tonnage of 14,056,846 tons, visited the port.

Dry docks. — Floating dock. — Patent slips. — Sturrock Graving dock can accommodate the largest vessels visiting the port ; it is equipped with one 50-ton crane, one 10-ton and some 2-ton cranes. For the dimensions of the graving dock, *see* Appendix II.

Robinson dry dock is entered from the north-western corner of Alfred basin. In 1950 it had a length of 500 feet ($152^{m}4$) and was equipped with one 4-ton and one 1½-ton crane.

The floating dock in Alfred basin has an overall length of 137½ feet ($41^{m}9$) and a lifting capacity of 450 tons.

There is a patent slip with a lifting capacity of 750 tons in Alfred basin, as well as four boat slips for yachts and small craft, including one in the Yacht basin.

Repairs.—All repairs to hull, engines and boilers can be executed.

Supplies.—Coal is stocked in large quantities. It can be brought off in lighters, or put onboard alongside the quays at the rate of 20 tons per gang per working hour, or taken in at the coaling jetty. There are several lighters.

Large supplies of fuel oil and diesel oil are maintained. Both types of oil may be obtained by pipe-line at any berth in Cape Town docks.

General supplies of all kinds can be obtained at Cape Town.

Water, besides being obtainable alongside the berths, can be supplied by tugs.

Charts 636, 2091, 2082, 578, 2095, 1013, 596, 2202a, 748a, 2203, 2127, 2483.

Charts 123, 1920.

Tugs.—Tugs are maintained by the Port Authorities. There are four powerful tugs and three pilot tugs; the four large tugs are equipped with radio, and with salvage and fire appliances and one tug is fitted with radar.

Hospitals.—There are six hospitals and two seamen's institutes.

Time signal.—A gun is fired from a battery near the flagstaff on Lion's Rump (*Lat. 33° 55′ S., Long. 18° 24′ E.*); for details, *see* Admiralty List of Lights, Fog Signals and Visual Time Signals, Volumes 4 and 10.

Life-saving.—A line-throwing apparatus is kept at the Castle, situated about 3½ cables south-westward of Duncan basin, and another is kept at the docks.

Deratisation.—*See* page 38.

Communications.—There is regular communication by sea with Europe, India and Australia, and with other ports in the continent of Africa.

The city is connected to Europe and Australia via Cocos Island by a regular air service, and there is also a regular coastal air service between Cape Town and Durban.

Cape Town is connected to the general railway system of the Union of South Africa.

Radio station.—The radio station is about 8 miles east-south-eastward of Cape Town; *see* page 35.

Climatic table.—*See* page 64.

Charts 1920, 636.

GREEN POINT TO CAPE OF GOOD HOPE.—Coast.—Dangers.—From Green point (*Lat. 33° 54′ S., Long. 18° 24′ E.*), *see* page 84, the western coast of the Cape peninsula as far as the Cape of Good Hope, 27½ miles southward, is rugged and indented.

Three Anchor bay is a small indentation situated 4 cables southward of Green point. Thence the coast trends south-westward for about 1½ miles to Sea point. Saunders rocks, with depths of less than 3 fathoms ($5^{m}5$) over them extend about 2 cables seaward from a position about 2 cables southward of Sea point. Bantry bay lies close south-eastward of Saunders rocks. A rock with less than 6 feet ($1^{m}8$) over it lies about 2½ cables north-north-eastward of Sea point.

Clifton bay is contained between two unnamed points situated, respectively, 7 and 12 cables southward of Sea point. Extensive foul ground, on which there is an islet 30 feet ($9^{m}1$) high, lies up to 2½ cables offshore from the southern of these two points.

North Lion's Paw, which dries 5 feet ($1^{m}5$), is steep-to except on its northern side, and lies about 8½ cables south-westward of Sea point, and about half a mile offshore.

South Lion's Paw, which dries 3 feet ($0^{m}9$) with a shoal head on which there is a depth of less than 6 feet ($1^{m}8$) about 2½ cables westward of it, lies about 3½ cables offshore, and 4½ cables southward of North Lion's Paw.

There are several other rocks close off the coast, both northward and southward of the Lion's Paws.

Camps bay lies close southward of the southern entrance point of Clifton bay, with Bak Oven bay about half a mile farther southward. Foul ground extends up to 2½ cables offshore in most parts of this coastline.

Charts 2091, 2082, 578, 2095, 1013, 596, 2202a, 748a, 2203, 2127, 2483.

Charts 1920, 636.

A point, known as Hottentot Huisje, situated about 4½ miles south-south-westward of Sea point, is the southern point of Kogel bay. Foul ground extends up to 3 or 4 cables offshore in the vicinity of this point.

Kommetje or Llandudno bay lies about one mile south-south-westward of Hottentot Huisje, with Sandy bay 1½ miles farther south-westward.

Logies rock lies close off the northern point of Kommetje bay, and depths of 20 fathoms (36^{m}6) lie from about 1½ miles to three-quarters of a mile off the intervening coast; inshore of these there are numerous off-lying rocks and patches of reef.

Oude Schip (*Lat. 34° 02′ S., Long. 18° 19′ E.*) is a low rocky point composed of large boulders, with a detached rock 25 feet (7^{m}6) high lying close off it, situated about three-quarters of a mile northward of Duiker point. Several rocks, with depths of less than 6 feet (1^{m}8) over them, extend about half a mile from the point.

Duiker point, the western extremity of Cape peninsula, situated about 9½ miles south-south-westward of Green point, is bold and rocky and has rocks and breakers extending about 4 cables seaward of it.

The coast for about 3 miles northward of Duiker point has not been closely examined, but depths of 20 fathoms (36^{m}6) may be found close inshore off Sandy bay.

Chart 2082, plan of Hout bay.

Some detached rocks, 5 to 10 feet (1^{m}5 to 3^{m}0) high, lie about 2½ cables offshore, 4 cables southward of Duiker point.

Vulcan rock, which dries 3 feet (0^{m}9) and is always marked by breakers, lies about 11 cables offshore and 16 cables southward of Duiker point. A rocky patch, which breaks in heavy weather, lies about half a mile south-eastward of Vulcan rock; a depth of 6 fathoms (11^{m}0) has been obtained over this patch, but it is possible that there are less depths over it.

Duiker island is a flat rock, 12 feet (3^{m}7) high, lying close to the coast about 1½ miles south-eastward of Duiker point; a line of breakers extends about 3 cables south-westward from the island. Though it appears to be deep between Duiker island and Vulcan rock, vessels should pass outside the latter. Duiker island is one of the Government guano islands, *see* page 3.

Charts 2082, plan of Hout bay, 636.

Hout bay.—Aspect.—Beacons.—This indentation in the high coastline is entered immediately south-eastward of Hangberg, *see* page 82, which is situated about 2 miles south-eastward of Duiker point (*Lat. 34° 02′ S., Long. 18° 18′ E.*). Constantiaberg (page 81) is situated about 2½ miles eastward of Hangberg. Little Lion's Head rises to an elevation of 1,430 feet (435^{m}9) about 2¼ miles north-eastward of Duiker point.

The coast on either side of the entrance to the bay is high and rugged, particularly on its eastern side, where hills, rising precipitously, are separated by a succession of ravines.

York point, on which are the ruins of a battery, is a low point situated 5½ cables north-eastward of Hangberg, and is composed of boulders.

A stone beacon stands close to the shore about one cable south-westward of York point; a reef of boulders and rocks extends south-

Charts 2082, 578, 2095, 1013, 596, 2202a, 748a, 2203, 2127, 2483.

Charts 2082, plan of Hout bay, 636.

eastward for about one cable from a position close eastward of the beacon.

A second beacon is situated close west-north-westward of York point and in a position about 1½ cables northward of the southern beacon.

Blockhouse point (*Lat. 34° 03′ S., Long. 18° 22′ E.*), on the opposite side of the bay, is situated about 7 cables eastward of York point. A conspicuous red-roofed house, situated about 6 cables northward of Blockhouse point, makes a good mark on which to enter the bay.

The head of the bay is low and sandy and Hout Bay river runs into it. There are numerous fishing huts and a cannery on the western side of the bay, but the township, which is much frequented as a seaside resort, lies in its north-eastern corner.

Fresh provisions can be obtained locally.

Breakwater. — Light. — Patent slip. — A small harbour for fishing vessels is situated about half a cable inside York point, consisting of a breakwater 600 feet ($182^{m}9$) long, and a piled wharf 200 feet ($61^{m}0$) long. There is an average depth of 6 feet ($1^{m}8$) alongside the wharf. Further construction was in progress in 1951.

A light is exhibited, at an elevation of 24 feet ($7^{m}3$), from a square concrete tower on the head of the breakwater.

There is a patent slip between the root of the breakwater and the beginning of the piled wharf, capable of taking craft up to 50 tons, with an overall length of up to 60 feet ($18^{m}3$).

Anchorage.—Winds.—Although Hout bay is open to south-westerly winds, a small vessel can even then obtain good shelter in a depth of about 3½ fathoms ($6^{m}4$), with the extremity of York point in line with Slangkop point, bearing about 195° ; the holding ground is excellent and of soft sand.

Except in very fine weather, the only landing place is on a small sandy beach within York point.

During South-easters the squalls come down very heavily off the high land in willy-waws, they are variable in direction, and are strongest in force on the eastern side of the bay. After some hours, as the South-easter freshens, the squalls reach over to York point, and in a bad South-easter are so violent that it is better for a vessel to put to sea rather than risk the danger of parting her cable. A vessel putting to sea in such circumstances will find that southward of Chapmans bay the wind will abate in violence and become more southerly in direction. A line of foam, giving a false appearance of danger, is frequently seen across the entrance to Hout bay.

Chart 636.

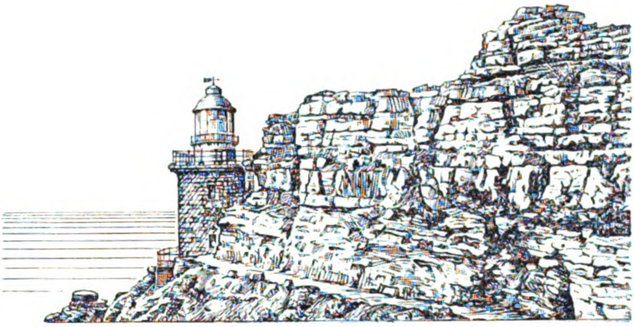
Coast.—Chapmans point is situated about 2¼ miles southward of Blockhouse point, and from it a reef, on which the sea always breaks, extends westward for about 3 cables. Chapmans peak, a bold steep eminence of dark appearance, rises immediately over the point to an elevation of 1,944 feet ($592^{m}5$) ; when seen from westward it presents two summits of almost equal height.

Between Chapmans point and Slangkop point about 3½ miles south-south-westward, is Chapmans bay, in which no safe anchorage can be obtained in any wind ; the shore of the bay is a sandy beach.

Local Magnetic Anomaly.—A local magnetic anomaly has been reported in the vicinity of Slangkop point.

Slangkop point.—Light.—Life-saving.—This point, on which is

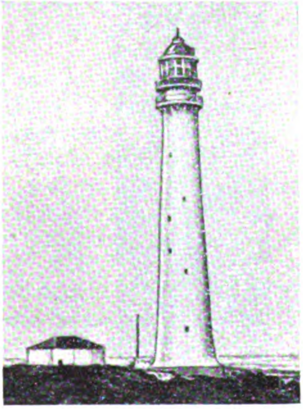
Charts 2082, 578, 2095, 1013, 596, 2202a, 748a, 2203, 2127, 2483.



Lighthouse bearing 168°.

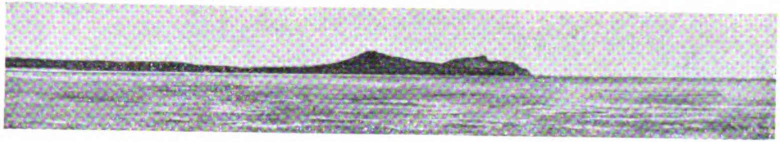
Cape point lighthouse from northward.

(*Original dated* 1918.)

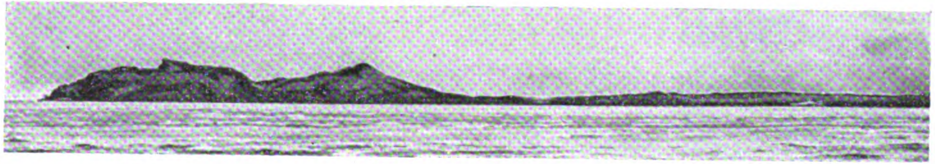


Slangkop point lighthouse.

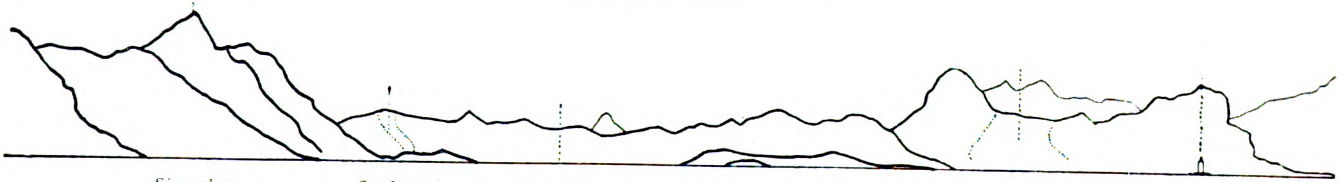
(*Original dated* 1918.)



Cape of Good Hope from south-westward.
(*Original dated* 1918.)



Cape of Good Hope from eastward.
(*Original dated* 1918.)


Simonsberg.
Sand patch.
Simons bay.
Sand patch.
Roman rocks lighthouse, ϕ Elsie's peak, bearing 328°, distant 6 miles.

Simons bay.
(*Original dated prior to* 1931.)

Chart 636.

the village of Kommetje, is low and sandy, but immediately within it the land rises steeply to the summit of a flat-topped hill, 560 feet (170^{m}7) high. Rocks and patches of kelp fringe the point, and foul ground extends nearly 1½ miles northward from it.

Slangkop point (*Lat. 34° 09′ S., Long. 18° 19′ E.*) may be identified by the lighthouse, and also by a long strip of sand, low down on the hill side which extends southward for about one mile from the point. With the exception of the sand patch under Little Lion's Head, *see* page 82, and a patch of sand on Rooi kop, situated on the False bay side of the Cape peninsula, there are no other patches of sand visible above the coast line between Lion's Head and the Cape of Good Hope. From northward, when the strip of sand is shut in, Slangkop point appears as a long flat plateau, *see* views facing page 83.

A light is exhibited, at an elevation of 135 feet (41^{m}5), from a white circular iron tower, 108 feet (32^{m}9) in height, situated on Slangkop point, *see* view facing page 92.

A line-throwing apparatus is kept at Slangkop point.

Coast.—From Slangkop point to the mouth of the Klaasjagers river, about 6 miles south-south-eastward, the coast becomes higher and rugged.

Menskop point is situated about 1½ miles southward of Klaasjagers river, with Olifants (Olifants Bosch) point about 1¼ miles farther southward. Hoek van Bobbenjaan (Blaauwberg point) lies about 2½ miles south-south-eastward of Olifants point, with the Cape of Good Hope about 4¾ miles farther south-eastward. Between Olifants point and the Cape of Good Hope the coast is from 300 to 400 feet (91^{m}4 to 121^{m}9) high, and is tolerably regular in outline; *see* view on chart 636.

Dangers.—Sunken rocks with patches of kelp fringe the coast from Slangkop point to Olifants point, and extend 5 cables offshore in places. With a westerly swell, the sea breaks heavily to a distance of nearly one mile offshore.

Albatross rock, with a depth of less than 6 feet (1^{m}8) over it, and from 7 to 13 fathoms (12^{m}8 to 23^{m}8) close round it, lies half a mile south-westward of Olifants point.

A rocky bank, with depths of 10 fathoms (18^{m}3) over it, and on which the sea breaks in bad weather, lies about 1½ miles west-south-westward of Hoek van Bobbenjaan; in heavy southerly gales, a continuous line of breakers has been observed to extend from this bank to the coast.

A bank, on which the depths are less than 20 fathoms (36^{m}6) and are very irregular, extends about 3 miles north-westward from Hoek van Bobbenjaan; vessels should be most careful to keep in depths of more than 20 fathoms (36^{m}6).

A reef lies about 2 cables offshore in a position about 2½ miles south-eastward of Hoek van Bobbenjaan.

CAPE OF GOOD HOPE.—The southern extremity of the Cape peninsula is surmounted by two peaks and terminates in a like number of points, of which latter Cape Maclear is the western and Cape point (*Lat. 34° 21′ S., Long. 18° 30′ E.*) the eastern. The northern of the two peaks, Vasco da Gama peak, 880 feet (268^{m}2) high is situated about 1¼ miles north-westward of the extremity of Cape point; the

Charts 2082, 578, 2095, 1013, 596, 2202a, 748a, 2203, 2127, 2483.

Chart 636.

south-eastern of the two peaks is 800 feet (243m8) high, and is situated near the pitch of Cape point. *See* view on chart 636 and views facing this page.

There is a small sandy bay, called Buffels bay, between Cape point and Cape Maclear in which vessels in a sinking condition may be beached in greater safety than on any other part of the adjacent coast westward of Cape point.

Lights. — Radiobeacon. — Signal station. — Life-saving. — A light is exhibited, at an elevation of 286 feet (87m2), from a square masonry tower, 30 feet (9m1) in height, situated on the extremity of Cape point, *see* view facing page 92.

An auxiliary light is exhibited from the base of the lighthouse, at an elevation of 251 feet (76m5).

A radiobeacon is situated at the old lighthouse, about 4 cables west-north-westward of Cape Point light tower.

A signal station is situated at the old lighthouse, where a daylight watch is kept.

A line-throwing apparatus is kept at Cape point.

Offshore depths.—A bank, on which the depths are less than 20 fathoms (36m6) fringes the Cape of Good Hope and extends about 2½ and 1¾ miles south-westward and southward, respectively, from Cape Maclear, and 2, 1½, and one miles southward, south-eastward, and north-eastward, respectively, from Cape point.

Rocky bank, with a least depth over it of 13 fathoms (23m8), rock and coral, lies from about 4½ to 6½ miles south-eastward of Cape point. This bank is covered by the *red* sector of Cape Point light between the bearings of 299° and 023°.

Off-lying dangers.—Bellows rock, lying on the edge of the 20-fathom (36m6) bank about 2 miles southward of Cape point, dries about 5 feet (1m5) and always breaks. It is steep-to except on its south-western side where there are sunken rocks, on which the sea does not always break, at a distance of about one cable from it.

Anvil rock, with a depth of 6 feet (1m8) over it, lies at the eastern end of a 3-fathom (5m5) rocky patch, about 1¼ miles south-eastward of Cape point. It breaks only at low water with a heavy swell, and there are depths of from 14 to 18 fathoms (25m6 to 32m9) close outside it.

South-west reefs, with depths of 4 and 5 fathoms (7m3 and 9m1) over them, usually break and appear to be patches on a rocky ledge projecting south-westward from Cape Maclear. They lie about 2 miles west-south-westward of Cape point, and on no account should vessels attempt to pass inside them.

Diaz rock (*Lat. 34° 21′ S., Long. 18° 30′ E.*), about 8 feet (2m4) high, is connected to Cape point by a sunken reef. Though it is deep about 2 cables seaward of the rock, it shoals again outside that distance.

Three pinnacle rocks, with depths of 4½ and 5½ fathoms (8m2 and 9m1) over them, lie between Diaz and Anvil rocks, rendering the passage between the latter rocks unavailable for vessels of deep draught, or even for smaller vessels in bad weather.

Bellows, Anvil and Diaz rocks, and also the pinnacle rocks between the latter two, are covered by the *red* sector of Cape Point light between bearings of 299° and 023°.

Slangkop point bearing 340° and open westward of Olifants point,

Charts 2082, 578, 2095, 1013, 596, 2202a, 748a, 2203, 2127, 2483.

Chart 636.

leads westward of all the above dangers, but does not clear those off Hoek van Bobbejaan.

Constantiaberg, bearing 339°, and well open eastward of Zwartkop, leads eastward of all the above dangers, and between Anvil rock and Rocky bank.

Vasco da Gama peak bearing 299° and open northward of the lighthouse, leads north-eastward of Anvil rock.

Directions.—In clear weather, vessels approaching the Cape of Good Hope from westward at night should make Cape Point light at a distance of about 23 miles, except when it bears more than 106°, in which case it will be hidden by the land and Slangkop Point light should be sighted at a distance of about 17 miles. Should the land or lights not be seen, a vessel should not approach the coast, but should keep south-westward in depths of more than 50 fathoms (91^m4) until such time as her position has been accurately ascertained.

Vessels rounding the Cape of Good Hope from westward, if bound into False bay, should pass not less than half a mile southward of Bellows rock, and thence steer eastward between Rocky bank and Anvil rock until clear of the latter.

Caution.—Vessels approaching the Cape of Good Hope, especially in thick weather or in any doubt of their positions, should never omit the precaution of obtaining soundings in good time.

FALSE BAY.—This large bay is entered between the Cape of Good Hope and Cape Hangklip (*Lat. 34° 23′ S., Long. 18° 50′ E.*), situated about 17 miles east-south-eastward. There are several dangers in the bay, but its northern and eastern sides are clear, though the bottom is foul and in most places unfit for anchorage. Breakers line the shore in a depth of from 4 to 5 fathoms (7^m3 to 9^m7) about half a mile from the beach.

Western side of False bay.—Explosives dumping ground.—Beacons.—This side of False bay is also the eastern side of the Cape peninsula. Buffels bay is a small indentation in the coastline, at which there is a fishing establishment and in which landing is possible, situated about 3 miles north-north-westward of Cape point and is marked by a white sand patch. On the ridge of hills behind this bay is a beacon and another stands close northward of the bay ; these beacons in line, bearing 233°, mark the position of Whittle rock, *see* page 98. There are depths of 4 or 5 fathoms (7^m3 or 9^m1) close to the shore of the bay, and a 15-foot (4^m6) patch lies about 3 cables offshore, three-quarters of a mile north-north-westward of Cape point.

Smitswinkel bay is situated about 3 miles northward of Buffels bay, and the intervening coast is backed by four sharp peaks including Paulsberg (*see* page 81). Rocks, some of which are above water, project about 4 cables from Partridge (Millers) point, the northern entrance point of Smitswinkel bay, and also from its southern entrance point. Batsata rock, 8 feet (2^m4) high, is the highest of those off the southern point ; a patch, over which there is a depth of 2 fathoms (3^m7), lies 2 cables north-eastward of Batsata rock.

About 9 cables south-eastward of Partridge point is a circular area, indicated by a pecked line on the chart, in which explosives have been dumped ; the area is now disused, but vessels should avoid it and anchoring or trawling within it are prohibited.

Charts 2082, 578, 2095, 1013, 596, 2202a, 748a, 2203, 2127, 2483.

Chart 636.

Millers (Rockland) point, situated about 1¼ miles northward of Partridge point, is the most prominent point on the western side of False bay; it slopes down to a ledge of dry rocks, off which, at a distance of about 2 cables south-eastward, is Bakkoven rock, an isolated rock 9 feet ($2^{m}7$) high, with a depth of 11 fathoms ($20^{m}1$) close to it; Castle rock, which dries, lies about 3 cables southward of Bakkoven rock.

Oatland point, with a few rocks off it, on one of which is a beacon for marking the position of Whittle rock, *see* page 98, is situated about 1½ miles northward of Millers point. Between these points The Spaniard and other rocks lie within 3 to 5 cables of the shore.

Rocklands point (*Lat. 34° 13′ S., Long. 18° 28′ E.*) is situated about one mile north-north-westward of Millers point.

Simons bay is situated between Oatland point and the southern point of the entrance to Elsie's bay about 3 miles north-north-westward; *see* page 99.

Chart 1849.

A flagstaff, 64 feet ($19^{m}5$) in height, stands about a cable east-north-eastward of the rear beacon of the northern pair which mark Whittle rock (page 98); two radio towers and three radio masts stand about a mile westward of the same beacon.

Chart 636.

Eastern side of False bay.—Lights.—Patent slips.—Cape Hangklip, the eastern entrance point of False bay, is only 10 feet ($3^{m}0$) high, but at about 1½ miles northward of it, Hangklip berg rises to an elevation of 1,448 feet ($441^{m}3$); this mountain, sometimes called False cape, is quoin-shaped, and when seen from southward resembles an island; from some directions its western face seems to overhang, hence its name; a sandy patch extends half-way up its south-eastern side, *see* views on chart 636.

A rock, over which the depth is less than 6 feet ($1^{m}8$), lies about three-quarters of a mile west-north-westward of the cape, and about 3½ cables offshore. As a heavy sea always breaks on the cape, and also for some distance outside this rock, vessels should give it a berth of at least one mile.

Within Hangklip berg, the land is low, but rises again to Sharp peak, a conspicuous mountain 2,826 feet ($861^{m}4$) high, at a distance of about 3½ miles north-eastward (chart 2082).

The eastern shore of False bay, from Cape Hangklip (*Lat. 34° 24′ S., Long. 18° 50′ E.*) northward as far as Gordons bay, a distance of about 14 miles, is bold and has no outlying dangers at a greater distance than three-quarters of a mile from it.

The Hottentot Holland range of mountains (chart 2082) slopes down to the southern side of Gordons bay, whence to Sharp peak is an unbroken chain of mountains.

Pringle bay, situated about 3 miles northward of Cape Hangklip, is open to westerly winds, but affords the best shelter to be found on the eastern side of False bay during south-easterly gales, in depths of from 9 to 10 fathoms ($16^{m}5$ to $18^{m}3$).

Kogel bay, between Pringle and Gordons bays, is not a good anchorage as the bottom in many places is rocky, though it does afford shelter from southerly and easterly winds.

Gordons bay is not recommended as an anchorage, as it affords but

Charts 2082, 578, 2095, 1013, 596, 2202a, 748a, 2203, 2127, 2483.

little shelter from south-easterly gales, notwithstanding the high hills on its southern and eastern sides. A heavy swell enters the bay with a south-easterly wind, causing a vessel at anchor there to lie across the wind. The bottom is sand and rock.

There is a small harbour for fishing vessels in Gordons bay, consisting of a northern breakwater about 600 feet ($182^{m}9$) long, and a southern breakwater about 1,100 feet ($335^{m}3$) long. A concrete jetty, 80 feet ($24^{m}4$) long and 80 feet ($24^{m}4$) wide, has an average depth of 8 feet ($2^{m}4$) alongside. The average depth in the harbour is 7 feet ($2^{m}1$).

A light is exhibited, at an elevation of 26 feet ($7^{m}9$), from a square concrete tower on the head of each breakwater.

There are two patent slips capable of taking craft up to 30 and 60 tons, respectively.

The South African Nautical College, *General Botha,* is established at Gordons bay.

The village had a population of 1,025 Europeans, and 310 coloureds and natives, in 1950-51.

Mostert's bay, on the northern side of the entrance to Gordons bay, is a natural boat harbour formed by the arc of a circle of sunken rocks extending some distance from the shore and having a narrow entrance. It affords good shelter inside, and on its northern side is the town of Strand, where there is a jetty.

Strand, which is connected by rail and road with Cape Town, for which it is a seaside resort, had a population, in 1948, of 9,270, of whom 5,270 were Europeans. The town of Somerset West, with a population of about 6,000, is situated about 2½ miles north-eastward of Strand (*Lat. 34° 07′ S., Long. 18° 50′ E.*).

A rocky patch, over which there is a depth of 5 fathoms ($9^{m}1$), lies about 1¼ miles southward of the entrance to Mostert's bay.

Northern side of False bay.—The northern side, or head, of False bay is a low sandy beach, with a continuous line of surf fronting it, so that it affords no landing and should in all circumstances be avoided.

North-western side of False bay.—Elsie's peak, 990 feet ($301^{m}7$) high, surmounts a rounded point separating Elsie's bay from Fishhoek bay, and is marked by a conspicuous quarry on its southern side.

Fishhoek bay is a slight indentation in the coast at the eastern end of the valley running through the Cape peninsula to Chapmans bay, *see* page 92.

Northward of Simons bay, the land, except at Fishhoek bay, ranges in height from about 800 to 1,200 feet ($243^{m}8$ to $365^{m}8$), rising to 1,664 feet ($507^{m}2$) at the summit of Muizenberg, *see* view on chart 636.

There are four remarkable sand patches on this part of the coast, the only ones on the western side of False bay, except that within Buffels bay ; the first is situated on the north-western shore of Simons bay, the second between that and Elsie's peak, the third in Elsie's bay, and the fourth in Fishhoek bay ; the western patch is a streak running down from the top of the hill, *see* view on chart 636 and view facing page 93.

Kalk bay is a watering place situated northward of Fishhoek bay immediately under the southern summit of the high land which terminates north-eastward in Muizenberg. It has a small harbour

Charts 2082, 578, 2095, 1013, 596, 2202a, 748a, 2203, 2127, 2483.

Chart 636.

for fishing vessels, consisting of a breakwater 782 feet ($238^{m}3$) long, connected to the railway, an inner mole, and a quay 260 feet ($79^{m}2$) in length, at the head of the harbour.

Muizenberg (*Lat. 34° 07′ S., Long. 18° 28′ E.*) is a seaside resort at the foot of the mountain of that name. It had a population, in 1951, of about 10,000. From Simons bay, the railway skirts the shore to Muizenberg, at which place it turns inland towards Cape Town.

Lights.—A light is exhibited, at an elevation of 25 feet ($7^{m}6$), from a tower, 15 feet ($4^{m}6$) in height, at the head of Kalk Bay breakwater, and another, at an elevation of 17 feet ($5^{m}2$), from the head of the inner mole.

Dangers in False bay.—Beacons.—Light-and-bell-buoy.—Whittle rock, with a depth over it of 7 feet ($2^{m}1$), seldom breaks. It lies about 4 miles east-south-eastward of Bakkoven rock (page 96), on the southern side of a rocky patch over which the depths vary from 7 to 10 fathoms ($12^{m}8$ to $18^{m}3$).

A light-and-bell-buoy, exhibiting a *white flashing* light *every five seconds* and carrying a radar reflector, is situated close eastward of the rock.

The position of Whittle rock is indicated by two pairs of beacons which in line lead directly over it.

The front beacon of the southern pair, situated close northward of Buffels bay, consists of a white concrete obelisk surmounted by a barrel, 48 feet ($14^{m}6$) in height; the rear beacon, situated on the ridge of the hills south-westward of Buffels bay, consists of a black concrete beacon surmounted by a barrel, 48 feet ($14^{m}6$) in height. These beacons in line bear 233°.

The front beacon of the northern pair, erected on a flat-topped rock near Oatland point, is 35 feet ($10^{m}7$) in height, painted white with a red horizontal band in its centre, and has an elevation of 56 feet ($17^{m}1$); the rear beacon, standing on the shoulder of a hill about 9¼ cables west-north-westward, is diamond-shaped, painted white, and 30 feet ($9^{m}1$) in height. These beacons, which are reported to be difficult to distinguish from the vicinity of the rock, together with a white-washed patch on a hill north-westward of Simonstown, in line bear 296°.

Chapmans peak, *see* page 92, bearing 315° and well open westward of Elsie's peak, leads about 4 cables westward of Whittle rock; and Roman Rocks lighthouse, *see* page 100, in line with Elsie's peak, bearing 328°, *see* view facing page 93, leads midway between Whittle rock and Partridge point. Also, if either pair of the beacons mentioned above are kept open of one another, respectively, Whittle rock will be cleared.

Seal island (*Lat. 34° 08′ S., Long. 18° 35′ E.*) is a low rocky islet, situated about 6¾ miles north-north-eastward of Whittle rock, and is surrounded by sunken rocks on which the sea usually breaks. It is one of the Government guano islands, *see* page 3, but landing on it is difficult, except when the sea is very smooth.

A conspicuous beacon, 223 feet ($68^{m}0$) in height, stands in the centre of Seal island.

A white wooden beacon, surmounted by a cross and elevated about 40 feet ($12^{m}2$), stands on the north-western side of Seal island.

York shoal is a rocky patch, with depths of from 6 feet to 4½ fathoms

Charts 2082, 578, 2095, 1013, 596, 2202a, 748a, 2203, 2127, 2483.

Chart 636.

($1^{m}8$ to $8^{m}2$) over it, lying about 1¼ miles south-south-eastward of Seal island; the sea generally breaks on its northern part, over which there is a depth of less than 2 fathoms ($3^{m}7$).

East shoal, lying about 3¼ miles east-south-eastward of Seal island, has general depths over it of from 4 to 9 fathoms ($7^{m}3$ to $16^{m}5$), but in one place there is a rock which nearly dries, and on which the sea always breaks.

A bank, on which the least depth is 6¼ fathoms ($11^{m}4$), and on which the sea breaks only in heavy gales, lies off Gordons bay, about 5¾ miles eastward of East shoal.

Chart 1849.

SIMONS BAY.—This bay is situated about 11 miles northward of Cape point, and near the north-western corner of False bay; it is accessible all the year round, and affords perfect shelter, for with heavy south-easterly gales, the only winds that cause inconvenience, vessels ride safely, and although the bay is exposed to easterly and north-easterly winds, these never blow with any strength.

Inside depths of 5 fathoms ($9^{m}1$) there are several detached dangers, some drying a few feet.

Simonstown is a naval dockyard port.

Dockyard port limits.—Regulations.—Regulations for this area, the limits of which are shown by pecked lines on chart 1849, will be found in Appendix I.

Dangers in approach.—Beacon.—Roman rocks (*Lat. 34° 11′ S., Long. 18° 28′ E.*) occupy a position in the centre of the approach to Simons bay, about one mile offshore; they consist of a group of rocks on the southern side of a bank on which the general depths are less than 10 fathoms ($18^{m}3$); one rock, on which is a lighthouse, is above water and is on the north-western side of the group; the remainder are awash and the group is surrounded by foul ground.

Castor rock, on the northern side of the same bank as Roman rocks, has a least depth over it of 16 feet ($4^{m}9$), and between it and the latter are patches of 18 and 22 feet ($5^{m}5$ and $6^{m}7$). A 32-foot ($9^{m}8$) rocky patch lies about 1¾ cables east-north-eastward of Roman Rocks lighthouse.

Rambler rock is a 27-foot ($8^{m}2$) patch, lying about 3 cables south-eastward of Roman Rocks lighthouse; a small rocky patch with a depth of 34 feet ($10^{m}4$) over it and which is steep-to, lies nearly one cable northward of Rambler rock.

Noah's Ark is a flat-topped rock 20 feet ($6^{m}1$) high, resembling a barn, lying about one-quarter of a mile offshore south-westward of Roman rocks; reefs extend a short distance north-westward and south-eastward from it.

Maidstone rock, about 2 cables east-south-eastward of Noah's Ark, is a sharp pinnacle with a depth of 23 feet ($7^{m}0$) over it. A 47-foot ($14^{m}3$) shoal is charted about 6 cables east-south-eastward of Noah's Ark; rocky patches with least depths of 50 and 54 feet ($15^{m}2$ and $16^{m}5$) over them lie about 3 cables and 4½ cables, respectively, eastward of Noah's Ark (*Lat. 34° 12′ S., Long. 18° 27′ E.*).

Rocky patch, on which the least depth is 10 feet ($3^{m}0$), lies about 1½ cables offshore and 3½ cables south-south-eastward of Noah's Ark.

Nimrod rock, with a depth of less than 6 feet ($1^{m}8$) over it, lies about 2¼ cables west-north-westward of Noah's Ark.

Charts 2082, 578, 2095, 1013, 596, 2202a, 748a, 2203, 2127, 2483.

Chart 1849.

Phœnix shoal, lying about 3 cables north-westward of Noah's Ark, has a depth of 3 feet ($0^{m}9$) near its edge, between which and the shore the depths are shallow and the bottom foul, with several patches drying from 2 to 5 feet ($0^{m}6$ to $1^{m}5$) ; in fact there are shoals in several places inshore of a line joining the north-eastern extremity of Phoenix shoal and Rocky patch, the positions of which can best be seen on the chart. One of these shoals, which dries 4 feet ($1^{m}2$) and is known as Phoenix blinder, situated about 1¼ cables west-north-westward of Nimrod rock, is marked by a beacon, consisting of a diamond painted in black and white horizontal bands.

Light.—Buoys.—A light is exhibited, at an elevation of 54 feet ($16^{m}5$), from a white cylindrical iron tower, with a red lantern and cupola, 45 feet ($13^{m}7$) in height, on the drying rock of Roman rocks (*Lat. 34° 11′ S., Long. 18° 28′ E.*).

A red can-shaped buoy, surmounted by a staff and cage, is moored about half a cable northward of Castor rock.

A red can-shaped buoy is moored off the north-eastern side of Phoenix shoal.

Dockyard.—The dockyard basin, situated on the south-eastern side of Simons bay, is formed by the East breakwater and West pier, which enclose an area about 1½ cables square. The entrance is about 290 feet ($88^{m}4$) wide, and the basin has depths in it of from 29 to 48 feet ($8^{m}8$ to $14^{m}6$), with the exception of the portion of the south-eastern corner cut off by the line of the dock wall, where the depth varies from 11 to 19 feet ($3^{m}4$ to $5^{m}8$). The dry dock, *see* Appendix II, and workshops are situated at the southern end of the basin.

A pier which, in 1944, had been dredged to a depth of 18 feet ($5^{m}5$) along both sides for a distance of 230 feet ($70^{m}1$) from its head, is situated on the southern side of the basin ; a dolphin stands a short distance north-eastward and south-westward of the head of the pier.

Westward of the basin are the coal stores, a camber dredged to 4 feet ($1^{m}2$), slips, etc. ; the Admiral's house, with its jetty, is on the western side of the bay.

Lights.—Beacons.—A light is exhibited, at an elevation of 56 feet ($17^{m}1$), from a masonry tower, 42 feet ($12^{m}8$) in height, situated on the northern angle of East breakwater.

Lights are exhibited, at an elevation of 27 feet ($8^{m}2$), from iron structures, 22 feet ($6^{m}7$) in height, situated, one on each side of the entrance to the basin, near the heads of the East breakwater and the West pier, respectively.

A flagstaff stands about a quarter of a cable west-south-westward of West Pier light-structure.

A beacon, 96 feet ($29^{m}3$) in height, stands about 1¼ cables south-south-westward of the entrance to the dry dock.

Lights are also exhibited at the head of the Town pier and the end of the camber pier.

Two rocks, which dry 2 and 3 feet ($0^{m}6$ and $0^{m}9$) and are known as the Oyster blinders, situated about one cable east-north-eastward and half a cable north-eastward, respectively, of the head of Town pier are each marked by a beacon, consisting of a diamond painted in black and white horizontal bands.

Two lights are occasionally exhibited from the signal station flagstaff southward of the Admiral's jetty.

Charts 636, 2082, 578, 2095, 1013, 596, 2202a, 748a, 2203, 2127, 2483.

Chart 1849.

Wharf rock.—Buoy.—Wharf rock, with a depth of 9 feet (2^{m}7) over it, lies about 1¼ cables north-eastward of the dockyard camber, and is marked by a red barrel buoy surmounted by a notice board inscribed " Rock ".

Signal station.—The signal station is situated about three-quarters of a cable southward of the root of the Admiral's jetty.

Anchorage.—Merchant vessels may anchor only in the berths assigned to them by the Senior Naval Officer, but a good berth for a large vessel is in about 10 fathoms (18^{m}3), half a mile offshore, with Noah's Ark (*Lat. 34° 12′ S., Long. 18° 27′ E.*) bearing about 117°, and the dockyard clock 215°. In 1935, foul ground, due to a sunken cable, was reported about 2¼ cables northward of the light-structure on the head of West pier, and vessels were warned not to anchor on it.

Vessels should moor with the anchors north-westward and south-eastward, with the best bower in the former direction during winter, when north-westerly winds are frequent and blow in strong gusts over the hills, and *vice versa* during the opposite season, when south-easterly winds predominate.

Moorings.—Scend.—Moorings for various classes of vessels are laid down off the dockyard and westward of West pier.

Nos. 2, 3, 4, and the Flagship's moorings are in depths of over 6 fathoms (11^{m}0). In the basin, off-moorings are laid abreast all berths. By the use of these off-moorings ships are kept well away from the basin wall and are thus protected from damage during the periods of scend which occur from time to time in the basin.

This scend is seldom worse than a minor source of anxiety to ships alongside and is not constantly predictable. Moderate winds from between north and east will arouse it very quickly, prolonged South-easters will in due course have the same effect ; and a considerable scend will sometimes be felt for a day or two after the cessation of hard blows from the north-west.

Charts 1849, 636.

Directions.—Power vessels, after clearing Anvil rock as previously directed, *see* page 95, should steer about 356°, midway between Whittle rock and the western shore, and when Elsie's peak and Roman Rocks lighthouse are in line, bearing 328°, *see* view on chart 636 and view facing page 93, course should be altered to keep that mark on until within one mile of the lighthouse, when the vessel should be steered to pass midway between the lighthouse and Noah's Ark.

The red buoy marking Phoenix shoal can be rounded at a convenient distance and the anchorage steered for, but should that buoy be missing, bearings of East Breakwater light will enable the shoal to be avoided.

In thick weather, and being uncertain of the position, a vessel should anchor when in a depth of less than 20 fathoms (36^{m}6).

By night.—When eastward of Anvil rock, with Cape Point light bearing about 298°, distant 3 miles, from near which position Roman Rocks light may be seen, a vessel should steer about 356° until the latter bears 328°, when it may be steered for, passing through the sector of East Breakwater light which shows *white* between the bearings of 306° and 315° and leads between Bakkoven and Whittle rocks, and also through the sector of the same light which shows *red* between the bearings of 276° and 306° and covers Maidstone rock and Phœnix

Charts 2082, 578, 2095, 1013, 596, 2202a, 748a, 2203, 2127, 2483.

Charts 1849, 636.

shoal, etc.; when the sector of East Breakwater light, which shows *white* between the bearings of 265° and 276° and leads between Roman rocks (*Lat. 34° 12′ S., Long. 18° 28′ E.*), and Phœnix shoal, is entered, that light may be steered for and the East breakwater rounded as convenient.

Passing eastward of Whittle rock, Cape Point light should not be brought to bear less than 220° until Roman Rocks light bears about 300°, when the vessel can be steered northward into the sector of East Breakwater light which shows *white* between the bearings of 265° and 276° and leads southward of York shoal.

Compass adjustment.—Vessels wishing to check or adjust compasses will find Hangklip berg and Sharp peak, *see* page 96, useful for that purpose. It very often happens that Hangklip berg shows up well when Sharp peak is obscured by mist; the true bearings of Hangklip berg, from a position 2¼ cables 014°, from the head of the Town pier in Simons bay, is 118½°, and of Sharp peak is 109°. As these mountains are both over 20 miles distant from the bay, these bearings are not materially affected by the position of the vessel in the bay.

Simonstown.—Port facilities.—This town lies at the foot of the hills at the head of Simons bay, of which hills Simonsberg (*Lat. 34° 12′ S., Long. 18° 26′ E.*), which rises to an elevation of 1,870 feet ($570^{m}0$) is situated about one mile southward of the dockyard.

In 1951, the total population was 10,400, of whom 6,100 were Europeans.

There is a naval hospital, a naval sanatorium, and a cottage hospital, which latter has accommodation for 25 patients.

There is a sailors' home and an institute.

Supplies of fresh meat, fish, vegetables and bread are plentiful; an ample supply of fresh water is available to vessels alongside. Supplies of any kind not obtainable in Simonstown can be procured from Cape Town.

Repairs to engines and boilers can be undertaken in the dockyard.

There is a 50-ton crane on West pier and a 20-ton crane on East breakwater.

Shipping.—In 1949-50 a total of 13 vessels with an aggregate gross tonnage of 65,377 tons entered the port.

Life-saving.—A line-throwing apparatus is kept in the town.

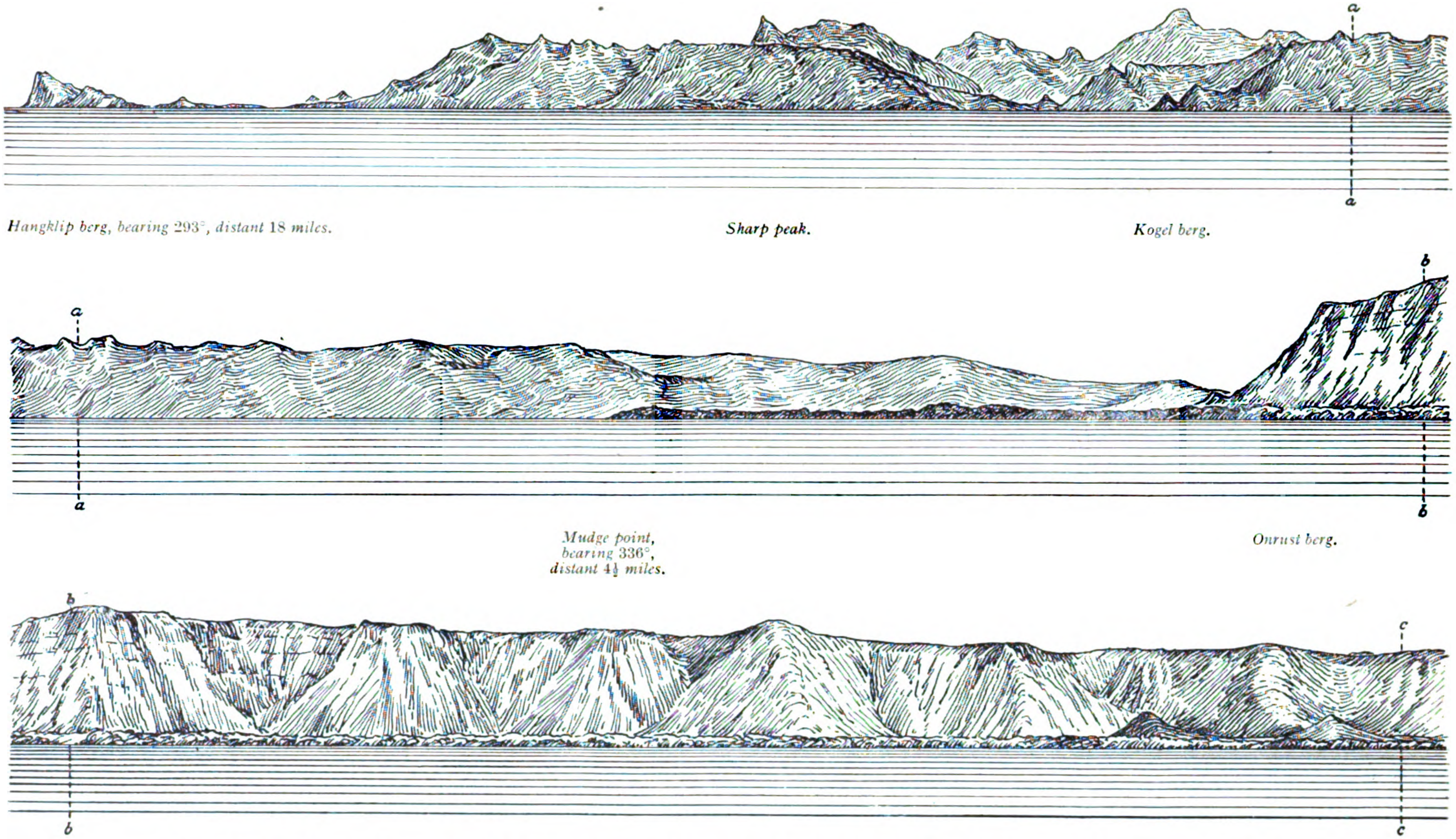
Caution.—A poisonous fish about 6 inches (152 mm.) in length, its back dark with deep black stripes, and belly white with faint yellow patches, is known as the toad fish; it swims near the surface, is easily taken with a hook and line, and when taken from the water puffs out considerably. Should any portion of this fish be eaten, death ensues in a few minutes.

Chart 2082.

CAPE HANGKLIP TO CAPE AGULHAS.—Coast.—Light.—Cape Hangklip (*Lat. 34° 24′ S., Long. 18° 50′ E.*) is described on page 96. The land eastward of Cape Hangklip is low for a distance of about 3 miles, and then rises to a chain of mountains which extend eastward within the coast, and of which Sharp peak (*see* above), 2,826 feet ($861^{m}4$) high, and near the western end of the range, is conspicuous.

Charts 2082, 578, 2095, 1013, 596, 2202a, 748a, 2203, 2127, 2483.

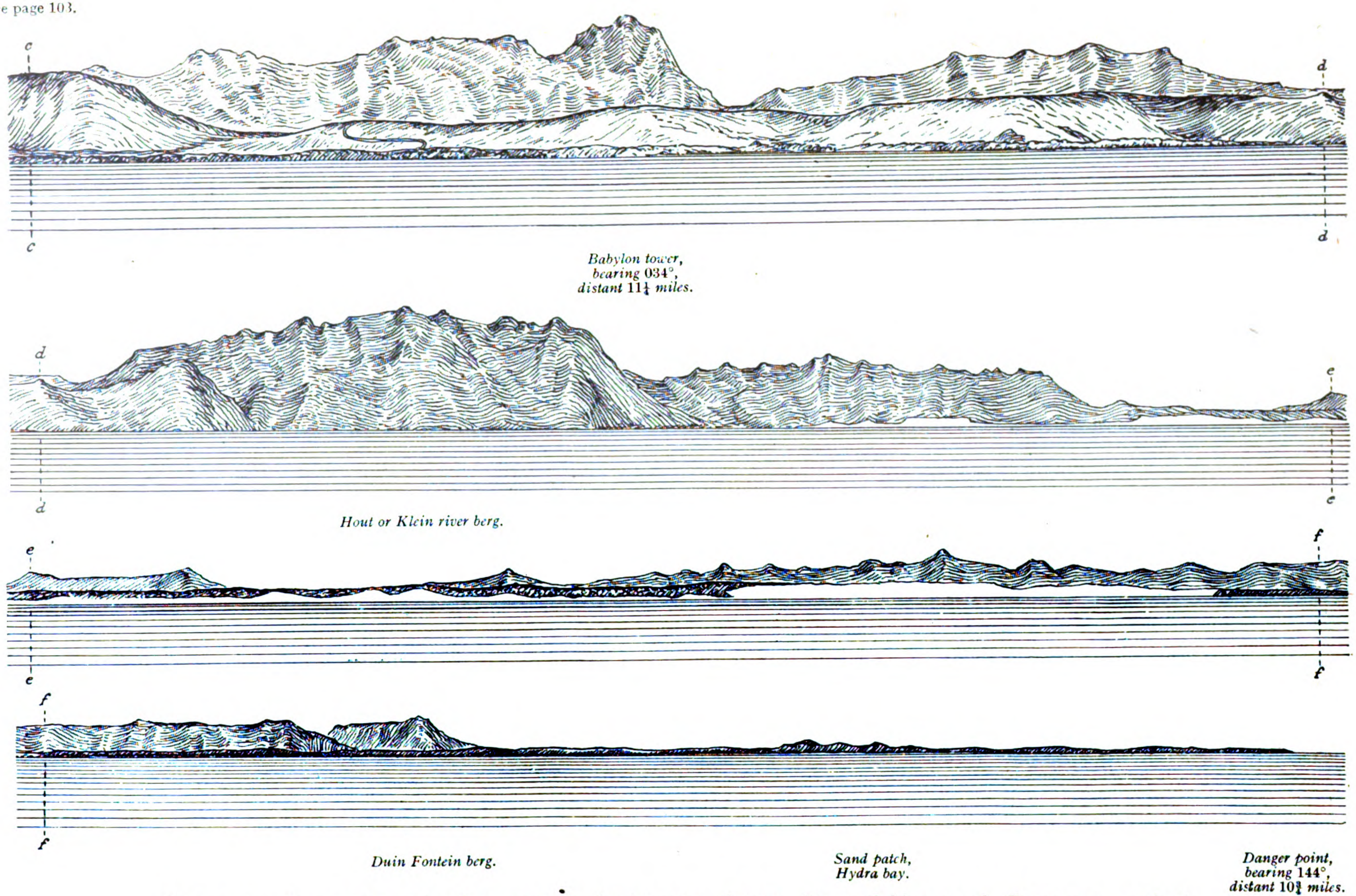
To face page 102.


a
a
Hangklip berg, bearing 293°, distant 18 miles.
Sharp peak.
Kogel berg.
a
b
a
b
Mudge point, bearing 336°, distant 4½ miles.
Onrust berg.
b
c
b
c

View in 7 parts of the coast between Cape Hangklip and Danger point.

(*See next page.*)

To face page 103.



View in 7 parts of the coast between Cape Hangklip and Danger point.

(*Original dated* 1853.)

Chart 2082.

Between Cape Hangklip and Danger point, about 27 miles south-eastward, the coast, with the exception of the sandy shores of Sandown and Walker bays, consists of rocky points, and landing can only be effected at certain places which are indicated on Chart 2082, *see* views facing this page and page 102.

Palmiet river, about 9 miles east-north-eastward of Cape Hangklip, is a rapid stream during winter, but its entrance is always blocked by sand. Landing from a boat can be effected at high water in fine weather in a small sandy cove about three-quarters of a mile eastward of the mouth of Palmiet river. The entrance to Bot river, about 5 miles eastward of the cove, is blocked by sand.

Mudge point, a low rocky point with several sunken, kelp-covered rocks lying close off it, is situated about 7 miles south-eastward of the mouth of Palmiet river; about 2 miles north-eastward of the point, a range of coast hills terminate in Onrust berg, a square bluff, 1,579 feet (481^{m}3) high, with a pile on it, *see* view facing this page and page 102.

After the wreck of H.M.S. *Birkenhead*, her gig landed in Kerries bay, a small rocky cove about one mile northward of Mudge point, but there is better and safer landing with easterly and south-easterly winds, in New bay (D'Urban cove), close northward of Mudge point.

Walker bay is entered between Mudge point and Danger point; it is remarkable for the immense stretch of sand at its head, with high sandhills in rear, one of which, near the middle, rises to a height of 427 feet (130^{m}1), in the shape of a pyramid. These sandhills are visible from a great distance, and give a distinctive character to this part of the coast. A long heavy swell rolls into the bay, and the depths are considerable within a mile of the beach.

Hermanus, a seaside resort, is situated on the north-western side of Walker bay about 6 miles eastward of Mudge point, and has several conspicuous buildings extending for about a mile along the coast. There is a breakwater and a quay at Hermanus. About 2 miles eastward of Hermanus is an hotel, which was burnt down in 1944. Close south-eastward of this hotel is Klein river, a stream of considerable size, but its mouth is choked with sand.

Chart 2082, plan of Point Danger.

Stanford cove, a small rocky inlet on the south-eastern side of Walker bay, about 5 miles north-eastward of Danger point, affords landing in easterly and south-easterly winds, but there are several rocky patches off the cove, which, with the heavy swell, render it less suitable for this purpose than Hydra bay.

There is a small fishing village at Gansbaai, about one mile south-south-westward of Stanford cove. Two breakwaters form a small harbour and there is a landing stage, concrete ramp and a slipway.

A light is exhibited at an elevation of 25 feet (7^{m}6) from a tower on the head of the south breakwater.

Hydra bay, lying about midway between Gansbaai and Danger point (*Lat. 34° 38′ S., Long. 19° 18′ E.*), may be easily distinguished by a sand patch which marks the face of the hillock behind it.

Off-lying dangers.—A rocky ledge, over which the depth is 15 feet (4^{m}6), extends half a mile west-south-westward from the northern entrance point of Gansbaai.

A reef, on which the depths vary from 2 feet to 3 fathoms (0^{m}6 to

Chart 2082, plan of Point Danger.

$5^{m}5$), extends north-westward for about 4 cables offshore in the northern part of Hydra bay. A rock, which does not always break, and over which there is a depth of 3 fathoms ($5^{m}5$), lies about 3 cables westward of the above reef, and a 21-foot ($6^{m}4$) patch lies about 4 cables northward of the reef.

Anchorage.—Directions.—The best anchorage in Walker bay is abreast Hydra bay about three-quarters of a mile offshore in depths of 12 or 14 fathoms ($21^{m}9$ or $25^{m}6$). This position is sheltered from south-easterly winds by Danger point, and the swell is less heavy than closer to the head of Walker bay.

When approaching Hydra bay from southward, Danger Point lighthouse should not be approached nearer than 2 or 3 miles. The bluff of Onrust berg, page 103, north-eastward of Mudge point, may be steered for until the sand patch in Hydra bay is well open bearing about 085°, when course may be altered east-north-eastward for the anchorage. Care should be taken to keep the low extremity of Danger point open westward of the points north-eastward of it, and bearing not more than 210°, in order to avoid the dangers mentioned above.

Danger point.—Light.—Off-lying dangers.—This point is formed by a tongue of low sandhills, covered with bushes and stunted trees, projecting west-south-westward from the base of Duin Fontein berg. The latter is a conspicuous bluff mountain 1,130 feet ($344^{m}4$) high, and remarkable from whatever direction it is viewed from seaward, *see* views facing pages 102 and 103.

The depths off Danger point are very irregular, the 20 fathoms ($36^{m}6$) line being found within 7 cables of the coast close northward of the point, but is as much as 4½ miles offshore south-westward of the point. At night, vessels in this vicinity should keep in depths of more than 35 fathoms ($64^{m}0$).

A light is exhibited, at an elevation of 150 feet ($45^{m}7$), from a white octagonal tower with a red dome, 60 feet ($18^{m}3$) in height, situated on the point.

Several detached sunken rocks lie off this part of the coast, of which the most dangerous, Birkenhead rock, is situated about 1¼ miles south-westward of the lighthouse. It has a depth of 2 fathoms ($3^{m}7$) over it, and is steep to. The sea breaks with violence on the rock, but often only at intervals of about a quarter of an hour. H.M.S. *Birkenhead* was wrecked on this rock in 1852.

Chart 2082.

Current.—Between Cape Hangklip and Cape Agulhas (*Lat. 34° 50′ S., Long. 20° 01′ E.*), a current setting about 080°, at a rate of one knot, has occasionally been experienced. The tidal streams are negligible.

Coast.—Off-lying dangers.—From Danger point to Quoin point, about 19 miles east-south-eastward, the coast is low and backed at a distance of from 2 to 4 miles inland by moderately high, bare and rugged hills; of these the most distinctive is Buffel Jacht berg, a conspicuous bluff hill, which is also known as Gunner's Quoin on account of its shape. It lies about 3 miles northward of Quoin point, but, when seen from westward, its resemblance to a quoin is not apparent.

A long heavy swell constantly breaks on the coast, which is everywhere inaccessible from the sea except in a small cove, 2½ miles north-

Chart 2082.

westward of Quoin point, where landing is practicable in south-easterly winds.

Chart 2082, plan of Point Danger.

About 5½ miles eastward of Danger point is the mouth of Uilkraal river, which has a broad sand bar at its entrance.

A group of islets and rocks, the latter both sunken and awash and with foul ground between them, extends about 3½ miles south-westward of Sandy point, which is situated about 7½ miles eastward of Danger point. Dyer island, the largest of the islets, lies about 2¼ miles south-westward of Sandy point. Geyser island lies about a quarter of a mile southward of Dyer island. Both islands are low and rocky.

Chart 2082.

Two rocky shoals, on which the sea breaks heavily when there is any swell, lie close together about 1½ miles offshore midway between Dyer island and Quoin point. The western shoal dries, and the eastern one has a least depth of 4 fathoms (7^{m}3) over it.

Chart 2082, plan of Point Danger.

Anchorage.—Directions.—The reef surrounding Dyer and Geyser islands forms a natural breakwater, north-westward of which vessels may find shelter in southerly and south-easterly gales. There is good holding ground in depths of from 10 to 12 fathoms (18^{m}3 to 21^{m}9), sand, with the extremities of Dyer island bearing about 128° and 156°, distant one mile. Landing is not always practicable, the best place being near the northern extremity of Dyer island. The anchorage is exposed to south-westerly winds.

Chart 2082.

Dyer and Geyser islands being white are difficult to make out when seen against the sand hills on the adjacent coast. In order to avoid the reef which extends westward from the islands, and does not always break in fine weather, a vessel from southward should keep Palmiet valley, a depression in the high land about 9 miles eastward of Cape Hangklip, bearing about 320°, open south-westward of Danger point, until Geyser island is in line with Gunner's Quoin, bearing 101°. From this position, course should be shaped for Duin Fontein berg, and when the summit of Gunner's Quoin, bearing about 108°, is open northward of Dyer island, steer for the former on that bearing, which leads to the anchorage.

Coast.—Quoin point is the southern extremity of the hummocky land extending in that direction from Buffel Jacht berg ; it is fringed by sunken rocks and breakers which extend as much as one mile offshore. Viewed from southward, Quoin point may be distinguished by two sandhills close to the point, *see* view facing page 114.

Between Quoin point and Cape Agulhas (*Lat. 34° 50′ S., Long. 20° 01′ E.*), 19 miles eastward, the coast is low and sandy as far as Sandknoll point, about 4 miles westward of Cape Agulhas, except southward of Zoetanysberg, a tableland lying parallel with the coast, where it becomes steep and rocky. The whole of this coast line is exposed to the full force of the ocean swell, and landing is impracticable.

The depths within the 20-fathom (36^{m}6) line, about 3 miles off the coast between Quoin point and Cape Agulhas, are less than those found westward of Quoin point ; foul ground, with some rocky patches which dry, extends as much as 1¾ miles off the coast for 3¾ miles eastward of the eastern side of Quoin point.

Charts 2095, 1013, 596, 2202a, 748a, 2203, 2127, 2483.

Chart 2082.

In strong north-westerly winds, tolerable shelter and smooth water may be found about 5 miles east of Quoin point, under the lee of the above-mentioned reefs, but, whenever practicable, the whole of this coast should be given a wide berth.

Charts 2082, 2083.

Cape Agulhas.—Light.—Signal station.—Life-saving.—This cape, the southern extreme of Africa, is a rocky projection which can be distinguished from other points in the vicinity by the features of the adjoining land. When viewed from a distance from seaward, either from eastward or from westward of Cape Agulhas, the northern and southern elevations, or ridges, resemble two oblong hummocks, while, if seen from southward, they appear as one ; the highest part is about one mile within the cape, *see* view facing page 114.

A light is exhibited, at an elevation of 126 feet ($38^{m}4$), from a circular tower, 63 feet ($19^{m}2$) in height, and painted with red and white bands, situated on the first undulation within Cape Agulhas.

A radiobeacon transmits from the lighthouse.

A signal station, with which vessels can communicate by the International Code of Signals, except on Sundays, is situated close to the lighthouse. Reports can be transmitted through Lloyds.

A line-throwing apparatus is kept at Cape Agulhas.

Directions.—When approaching any part of the coast westward of Cape Agulhas, the light, which is obscured when bearing more than 095°, should be kept in sight.

By night, vessels from westward after passing Cape Agulhas at a safe distance, should take careful bearings of the light as long as it remains visible ; it is advisable not to bring it to bear less than 254°, on which bearing it leads 3 miles outside the dangers extending from Struys point, *see* page 108.

Caution.—Fishing vessels are often met with in the vicinity of Cape Agulhas (*Lat. 34° 50′ S., Long. 20° 01′ E.*) ; it is advisable to give them a wide berth.

Climatic table.—*See* page 65.

Charts 2095, 1013, 596, 2202a, 748a, 2203, 2127, 2483.

CHAPTER III

CAPE AGULHAS TO WOODY CAPE INCLUDING PORT ELIZABETH AND BIRD ISLANDS

Charts 2084, 2095.

AGULHAS BANK.—The limits of this bank, which extends about 120 miles south-south-eastward of Cape Agulhas and on which the depths are less than 100 fathoms (182^{m}9), are fairly well defined between the Cape of Good Hope on the west, and the Bashee river on the east.

The general depths over the bank are from 45 to 80 fathoms (82^{m}3 to 146^{m}3), increasing to about 100 fathoms (182^{m}9) on the southern part of the bank.

Grue bank (*Lat. 35° 00′ S., Long. 23° 12′ E.*), where depths of from 23 to 37 fathoms (42^{m}1 to 67^{m}7) were reported in 1917, and Hardy bank, situated about 19 miles south-westward of Grue bank, where depths of from 15 to 46 fathoms (27^{m}4 to 84^{m}1) were reported in 1940, are the only places where the edge of the Agulhas bank appears to be very steep. Inside the 100-fathom (182^{m}9) line, a depth of 13 fathoms (23^{m}8), which has not been examined and over which the sea breaks heavily in bad weather, lies about 49 miles east-south-eastward of Cape Agulhas. Browne's bank, with a least charted depth of 65 fathoms (118^{m}9), lies about 35 miles north-eastward of the southernmost corner of Agulhas bank.

The nature of the bottom has not been sufficiently ascertained for a vessel to be able to determine her position by its quality, but eastward of Cape Agulhas, the bottom is either rocky, or of coarse sand, shells and small stones. Westward of that cape, mud or green sand will be found southward of latitude 35° 15′ S., while northward of this parallel, in depths of less than 50 fathoms (91^{m}4) the bottom is of rock, sand or stones, and, in depths of over 90 fathoms (164^{m}6), generally sandy with black specks.

The effect which the Agulhas bank has on the heavy seas which roll on to it, is remarkable ; outside the bank, a vessel may be labouring heavily in a turbulent and irregular sea, but, directly depths of from 60 to 70 fathoms (109^{m}7 to 128^{m}0) are reached, the sea becomes comparatively smooth.

For direction and strength of currents in the vicinity of the Agulhas bank, *see* pages 20 to 22, and note on chart 2095.

Charts 2082, 2083.

CAPE AGULHAS TO CAPE ST. BLAIZE.—Coast.—Between Cape Agulhas and St. Mungo point and thence to Northumberland

Charts 1013, 596, 2202a, 748a, 2203, 2483.

Charts 2082, 2083.

point, 3¼ miles east-north-eastward, the coast consists of rugged sandstone and quartz rocks, fringed by reefs which extend as much as 4 cables offshore, and is unapproachable by boats at all times. The sea breaks heavily all along this coast, especially during southerly winds.

Northumberland point is low, sandy and fringed with a dangerous reef with some rocks awash on it, which extends 1¼ miles eastward of the point ; a sunken rock, over which there is a depth of less than 6 feet (1^{m}8), and which sometimes breaks, lies close off the eastern extremity of the reef.

Off-lying dangers.—A shoal, with a depth of 6½ fathoms (11^{m}9) over it, lies about 1½ miles south-south-westward of Cape Agulhas lighthouse, and from it shoals of 7 fathoms (12^{m}8) extend westward for a distance of 1¾ miles ; these shoals, which break in bad weather, are dangerous to deep draught vessels even in a moderate swell.

A shoal, with depths of from 7 to 8 fathoms (12^{m}8 to 14^{m}6) over it, and over which the sea breaks heavily in bad weather, lies between 3 and 4 miles east-south-eastward of Northumberland point.

Chart 2083.

Coast.—Beacon.—Between Northumberland point and Struys point (*Lat. 34° 41′ S.*, *Long. 20° 14′ E.*), about 11 miles north-eastward, is Struys bay which affords shelter with winds between west and north-west. With winds between east and west-south-west, the bay is wholly unsafe and should not be approached, as the sea then breaks in 7 to 8 fathoms (12^{m}8 to 14^{m}6).

A sandy beach extends from abreast the houses in the south-western corner of the bay to within 2 miles of Struys point, where the coast is fringed with jagged rocks. Within the sandy beach are numerous sandhills, 100 feet (30^{m}5) high, and partially covered with scrub, while in rear of the sandhills, the land rises to an elevation of 200 feet (61^{m}0), terminating in a green-covered ridge.

Heuntnges (Honing Nest) river enters the sea between bare sandhills at the head of the bay. It is small and often fordable at its mouth, but it is dangerous.

Struys point is formed by bare sandhills, 190 feet (57^{m}9) high, which slope southward for about one mile to its extreme, and terminate in rock which dries.

A pyramidal stone beacon, surmounted by a ball 4 feet (1^{m}2) in diameter, is situated on Struys point at an elevation of 36 feet (11^{m}0) ; it is 34 feet (10^{m}4) in height, and is painted red to seaward and with red and white bands on its eastern and western sides.

Dangers.—Several detached patches of reef extend south-eastward for about 1¾ miles from Struys point. Outer Blinder, the outermost patch, has a depth of 3 fathoms (5^{m}5) over it, with depths of from 4 to 6 fathoms (7^{m}3 to 11^{m}0) close-to, and from 7 to 9 fathoms (12^{m}8 to 16^{m}5), at a distance of 4 cables.

Bulldog or Saxon reef, about 3 cables north-westward of Outer Blinder, has a depth of 2 fathoms (3^{m}7) over it, 8 fathoms (14^{m}6) close-to, and about 4 fathoms (7^{m}3) between it and Outer Blinder. Between the rocks lying between Bulldog reef and Struys point, are boat passages which are only available in fine weather. Cape Agulhas light is obscured over these dangers.

Vessels from eastward should not rely on bearings of Cape Agulhas

Charts 2095, 1013, 596, 2202a, 748a, 2203, 2483.

Chart 2083.

light for clearing the dangers off Struys point, as, owing to these dangers being over 14 miles distant from the light, the latter may not be visible when approaching the vicinity of the reefs, even in moderately clear weather. Under such circumstances, vessels should keep in depths of more than 30 fathoms ($54^{m}9$), when in the vicinity of Struys point.

Current.—No current was observed in Struys bay during the survey in 1848, and it is possible that any current experienced off the coast will be the effect of more or less distant winds; easterly, westerly and north-westerly sets have been reported especially after gales between south and east. A north-westerly set of 1¼ knots and an easterly set of one knot have been experienced.

Anchorage.—**Directions.**—The anchorage recommended is in the south-western corner of Struys bay, about one mile north-north-eastward of Northumberland point in 5 fathoms ($9^{m}1$), sand. Here the bottom is clean, while closer in it is foul. Vessels of deep draught should anchor farther out in a depth of about 7 fathoms ($12^{m}8$).

The landing place is a small cove, situated on the north-western side of Northumberland point, and sheltered by a shelf of shingle projecting from each entrance point of the cove.

Owing to the similarity of the features of the shores of Struys bay and Marcus bay, the bay eastward of it, it may at times be somewhat difficult to determine whether the vessel is eastward or westward of Struys point. In hazy or foggy weather, the high land of Cape Agulhas may be invisible, while the sandhills of Struys bay and the breakers off Northumberland point may be distinctly seen. In such circumstances, care is necessary in approaching the land, but Struys point should be identified by the beacon on it.

Vessels from westward should round Northumberland point at a distance of about 2 miles in depths of from 9 to 10 fathoms ($16^{m}5$ to $18^{m}3$) to avoid the dangers off it.

Vessels from eastward will clear the dangers off Struys point by keeping Cape Agulhas light bearing more than 243°.

As a general rule, vessels seeking temporary shelter in Struys bay in a north-westery gale should put to sea immediately it subsides, as the wind frequently changes in a few hours from blowing hard from north-west to south-east or south with a heavy sea, which very quickly arises.

Coast.—**Dangers.**—Between Struys point and Martha point, about 11 miles north-eastward, the coast consists of a sandy beach fringed with flat jagged rocks and reefs, the latter having depths over them of from 4 to 6 fathoms ($7^{m}3$ to $11^{m}0$). The reefs extend as much as 1¾ miles from the coast in places, and in bad weather the sea breaks heavily on them, rendering the beach unapproachable.

Within the sandy beach are rocky hills covered with sand, which rise to a height of about 150 feet ($45^{m}7$), and further inland is a range of green-covered hills.

Hoop point (*Lat. 34° 37′ S., Long. 20° 19′ E.*), about midway between Struys and Martha points, is an isolated hill with triple peaks which resembles a cone when viewed from south-eastward.

Marcus bay is entered between Struys point and Hoop point; there are some rocky patches in it, but, in westerly and north-westerly winds, it affords shelter equal to that in Struys bay.

Atlas reef, which has a least depth of 3 fathoms ($5^{m}5$) over it, lies

Charts 2095, 1013, 596, 2202a, 748a, 2203, 2483.

Chart 2083.

easily identified. Patches of detached rocks which dry and break, lie about 3 cables offshore and about 6 cables south-westward of Bull point.

Gouritz river enters the sea about 5 miles east-north-eastward of Bull point. The sea breaks across the mouth of this river which is very narrow half a mile within the entrance, and although there is a sandy beach on the western side of its mouth, the breakers are generally too high to make it available as a landing place.

Cape Vacca.—Cape Vacca (*Lat. 34° 20′ S., Long. 21° 55′ E.*) is a low tongue of rock and shingle which projects eastward from a round hill on the eastern side of Gouritz river entrance. In rough weather, the sea breaks at a distance of 5 or 6 cables south-eastward of the cape in a depth of about 9 fathoms ($16^{m}5$), and from the discoloration of the water and the uneasy ground swell in the vicinity, it appears probable that other foul ground exists here.

Care is necessary in passing this low cape at night, as it is only just within the range of Cape St. Blaize light, which is not visible when bearing more than 052°, or about half a mile outside Cape Vacca. Should the light not be seen, vessels should sound frequently and should keep in depths of more than 25 fathoms ($45^{m}7$) when westward of Cape St. Blaize.

Coast.—From Cape Vacca to Cape St. Blaize, about 15 miles north-eastward, the coast trends north-eastward and forms two sandy bays, separated by Flesh point, a rocky projection. About one mile within the sandy beaches are hills, between 400 and 500 feet ($121^{m}9$ and $152^{m}4$) high, and covered with vegetation. The sandy beach ceases at Pinnacle point, which is the well-defined commencement of the rocky cliffs rising to a height of about 400 feet ($121^{m}9$) which extend thence to Cape St. Blaize, about 4 miles eastward.

Flesh bay is entered between Cape Vacca and Flesh point, 2¾ miles north-eastward, and affords temporary shelter during north-westerly gales, but landing is only possible in fine weather. Flesh point may be identified by a flesh-coloured patch of sand, and by a bare sand-hill, 271 feet ($82^{m}6$) high, lying 1½ miles westward of it.

Fish bay is entered between Flesh point and Pinnacle point, about 9 miles north-eastward; the breakers which line the shore are usually high and occasional patches of rock show through them at low water. Fish bay affords shelter from north-westerly gales, the anchorage recommended being in the western corner of the bay, in depths of 7 or 8 fathoms ($12^{m}8$ or $14^{m}6$), with Flesh point, which is steep-to on its eastern side, bearing about 157° distant 1¼ miles. It is advisable for vessels to put to sea as soon as the gale subsides, for then a heavy south-westerly swell sets in and causes a dangerous breaking sea.

The best landing place is in a sandy cove between the rocks close to Flesh point, but in fine weather boats may land near the head of the bay.

Chart 639.

Cape St. Blaize.—**Dangers.**—Cape St. Blaize is a bluff about 250 feet ($76^{m}2$) high, the extreme point being a tongue of low land which is fringed by a reef extending about 1½ cables south-eastward of the point; just below the bluff of the cape is the Logan stone, a remarkable whitewashed rock.

Blinder rock, over which there is a depth of 9 feet ($2^{m}7$), with depths

Charts 2095, 596, 2202a, 748a, 2203, 2483.

Chart 639.

of from 5 to 7 fathoms ($9^{m}1$ to $12^{m}8$) close-to, lies about 4½ cables east-south-eastward of the lighthouse on the cape ; the sea breaks on it at low water and in rough weather.

Light.—Fog signal.—Signal station.—Life-saving.—A light is exhibited, at an elevation of 240 feet ($73^{m}2$), from a white square tower, 45 feet ($13^{m}7$) in height, situated on the bluff of Cape St. Blaize (*Lat. 34° 11′ S., Long. 22° 09′ E.*). A fog signal is sounded from the lighthouse. *See* sketch on chart 639.

There is a signal station situated near the lighthouse which is connected to the general telephone system ; day and night watch is kept, except on Sundays.

A line-throwing apparatus is kept at Cape St. Blaize.

MOSSEL BAY.—This bay is entered between Cape St. Blaize and the mouth of the Little Brak river, 5½ miles northward. About 3 cables northward of Cape St. Blaize, the coast curves west-north-westward for 2½ miles and the shore of the bay is rocky except for sandy coves at Munrose (Munro) bay and Die Bakke (Erme bay). Vaarkens cove, close eastward of the harbour, is fringed by a sea wall. The town of Aliwal lies southward of Vaarkens cove, on the eastern side of which a harbour has been constructed. From 2½ miles west-north-westward of Cape St. Blaize, a sandy beach extends northward and north-eastward for about 5 miles to the mouth of Little Brak river ; Hartenbosch river flows out through this beach about 2 miles south-westward of Little Brak river.

Within the sandy beach are prominent sandhills, and a conspicuous large sandpatch, useful for identifying the bay to vessels approaching from eastward, lies close to the mouth of Hartenbosch river ; two church spires in the centre of the town, and the power station chimney about one mile west-north-westward of Cape St. Blaize lighthouse, are also prominent.

Seal island, a small islet about 15 feet ($4^{m}6$) high, is situated about 2¾ miles north-westward of Cape St. Blaize lighthouse ; it is about 3 cables from the beach, with depths of from 3 to 5 fathoms ($5^{m}5$ to $9^{m}1$) between it and the shore.

Port limits.—Port regulations.—The limits of the port under the Harbour Authorities are as follows :—The area contained westward of a line drawn from Cape St. Blaize to the mouth of the Little Brak river, including the estuary and tidal waters of that river.

The General Regulations for the Harbours of the Union of South Africa are in force at Mossel bay. A copy of the port regulations will be supplied to every vessel on arrival, and it is obligatory on the master to observe them.

Pilotage.—Merchant vessels arriving at Mossel bay between sunrise and sunset are met by the Harbour Master if required, and are taken by him to a safe anchorage. Vessels arriving at night should anchor with the light on the head of New jetty bearing about 174°, on which bearing it changes colour from *red* to *green*.

Lights.—Caution.—Beacons.—A light (*Lat. 34° 11′ S., Long. 22° 09′ E.*) is exhibited, at an elevation of 42 feet ($12^{m}8$), from a concrete column, 31 feet ($9^{m}4$) in height, situated on the head of New jetty in Mossel Bay harbour.

Charts 2083, 2095, 596, 2202a, 748a, 2203, 2483.

Chart 639.

A light is exhibited, at an elevation of 15 feet (4^m6), from a steel column at the head of the breakwater.

Vessels are warned not to approach within half a cable of the breakwater head as shoaling may occur.

A beacon surmounted by a diamond, formed of alternate white and black battens, 20 feet (6^m1) in height, stands on a hill about 3 cables southward of Mossel Bay harbour, *see* sketch on chart 639; a second beacon surmounted by a black diamond, is situated about quarter of a cable northward of the first mentioned beacon. These two beacons in line, and at night the light on the head of New jetty, bearing about 174°, indicate the best line for anchoring.

A white triangular beacon, 21 feet (6^m4) in height, stands about 14 cables west-north-westward of Seal island. This beacon, in line with the island, leads towards the anchorage.

Anchorage.—Directions.—The anchorage recommended for power vessels is northward of the town in depths of from 6 to 8 fathoms (11^m0 to 14^m6), according to draught and to the amount of swell existing, at from 8 to 10 cables from New jetty with the leading beacons and light, bearing 174°. Smaller vessels may anchor closer in than 8 cables or off Munrose bay in 4 fathoms (7^m3) and thus be well protected from south-easterly winds by the breakwater. Only small coasters can be accommodated alongside. Should the swell be heavy, vessels may with advantage anchor westward of this line, as the nearer to Seal island, the less is the swell felt. The bay affords good shelter during the winter months, May to October, when heavy north-westerly gales may occur; during the strength of these gales, the water in the bay is smooth, and vessels are recommended to shelter here rather than to struggle against the heavy seas off Cape Agulhas. It sometimes happens, however, that a heavy south-westerly swell sets into the bay if the wind backs to west or west-south-west, rendering the anchorage unsafe and landing difficult and sometimes impracticable; under such circumstances vessels should not anchor in depths of less than 8 fathoms (14^m6) at any season.

During the summer months, October to May, moderate south-westerly winds are common and south-easterly gales may be expected. When they occur, the anchorage is exposed to the full effect of the open sea; these gales, however, do not blow home. A heavy breaking sea rolls in, and vessels usually ride safely with a long scope of cable, with a coir or hempen spring to ease the strain, which is also lessened by a strong east-going current or under-tow; the holding ground is good.

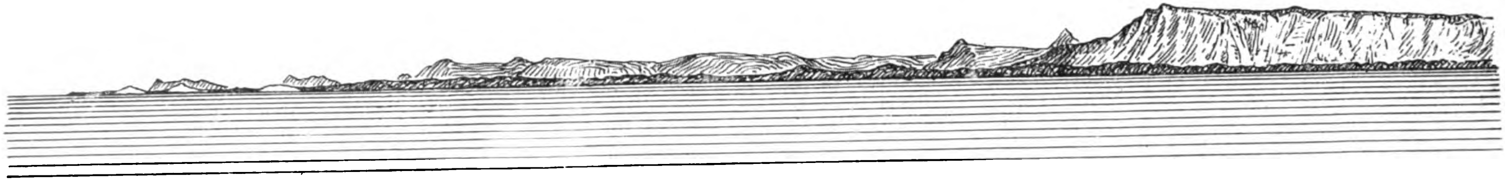
In cases of emergency, vessels may best be beached at the southern end of the sandy beach in the bight southward of Seal island.

Vessels from westward should identify the conspicuous bluff of Cape St. Blaize (*Lat. 34° 11′ S., Long. 22° 09′ E.*), the land within the bluff appearing quoin-shaped from this direction. When rounding the cape, Pinnacle point should be kept bearing not less than 255°, and open southward of the rock under the cliffs, close westward of the lighthouse bluff, until the large sandpatch near the mouth of Hartenbosch river bears 329°, when course may be shaped for rounding the cape.

Vessels from eastward should identify Cape St. Blaize lighthouse, which, being white, shows conspicuously against the dark background, and the remarkable sandpatch near the mouth of Hartenbosch river.

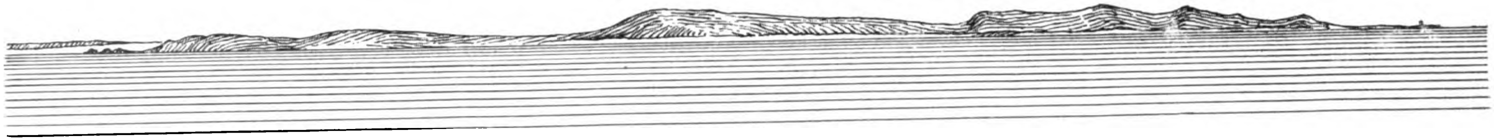
Charts 2083, 2095, 596, 2202a, 748a, 2203, 2483.

To face page 114.



Quoin point to Gunner's Quoin.

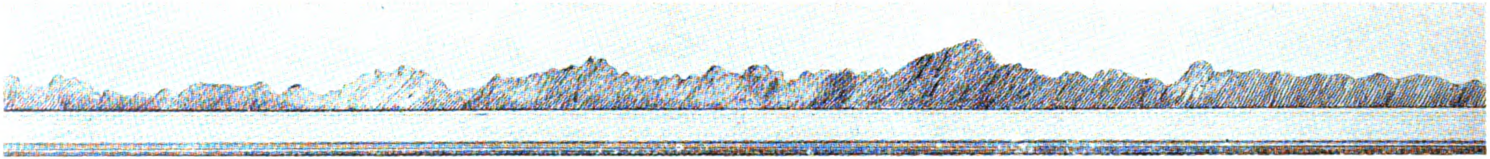
(*Original dated* 1853.)



Cape Agulhas and coast in vicinity from westward.

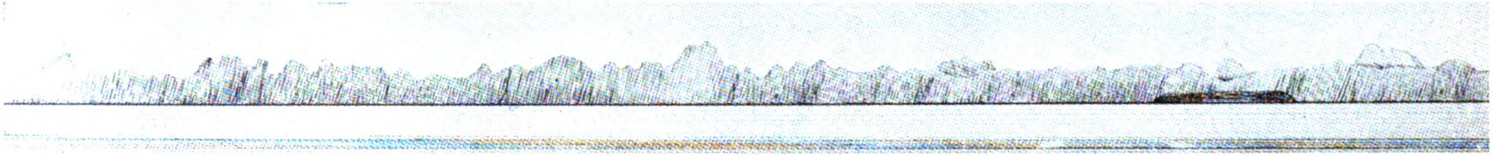
(*Original dated* 1853.)

To face page 115.



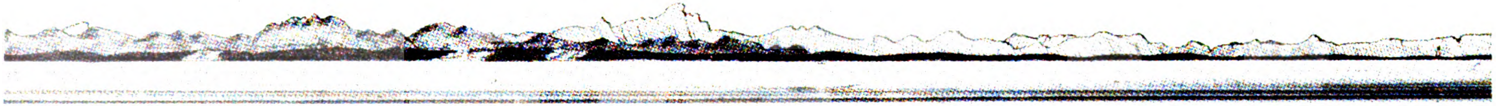
Cradock berg and the Outeniqua mountains.

(*Original dated* 1920.)



Coast between Formosa peak and Karredouwsberg.

(*Original dated* 1920.)



Coast in vicinity of Cape St. Francis.

(*Original dated* 1920.)

Chart 639, plan of Mossel bay harbour.

Mossel Bay harbour.—Depths.—The harbour is sheltered by a breakwater, 878 feet (267^{m}6) in length and contains two jetties and three quays. The depths in the harbour vary from between 16 and 21 feet (4^{m}9 and 6^{m}4) in the entrance to 4 feet (1^{m}2) alongside No. 1 quay and 9 to 14 feet (2^{m}7 to 4^{m}3) alongside No. 2 quay.

No. 1 or New jetty forms the western side of the harbour and is 350 feet (106^{m}7) in length, with depths of from 10 to 15 feet (3^{m}0 to 4^{m}6) alongside. The passenger landing steps are on this jetty.

No. 2 jetty, on the eastern side of the harbour, projects north-westward from the middle of No. 1 quay for 120 feet (36^{m}6), with depths alongside of from 4½ to 10 feet (1^{m}4 to 3^{m}0).

No. 1 quay extends 100 feet (30^{m}5) north-eastward and 115 feet (35^{m}1) south-westward of No. 2 jetty with a depth of 4 feet (1^{m}2) alongside and is used by small fishing craft.

No. 2 quay extends from No. 1 quay to the root of the breakwater and is 190 feet (57^{m}9) in length with depths alongside of from 9 to 14 feet (2^{m}7 to 4^{m}3).

No. 3 quay or New quay, situated on the south-western side of the breakwater, is 380 feet (115^{m}8) in length, with a least depth of 20 feet (6^{m}1) alongside, in 1953.

Port facilities.—The two jetties and No. 2 quay are connected to the general railway system.

There are two electric 4-ton cranes and one 2-ton hand crane on No. 1 or New jetty, and one 7-ton electric crane and one 10-ton travelling crane on the breakwater. Fourteen lighters are available.

Tugs.—Repairs.—There are two tugs, both of which are fitted with modern salvage and fire appliances.

Moderate repairs to hull, engines and boilers can be executed. There is a patent slip near No. 1 jetty with a lifting capacity of 240 tons, *see* Appendix II.

Supplies.—There is a small stock of coal, but none is available for bunkering. There is no oil fuel available.

Fresh water is plentiful and can be supplied by a tug at the rate of about 7½ tons per hour.

Fair quantities of fresh provisions may be obtained with notice.

Chart 639.

Town.—The town of Aliwal, commonly known as Mossel bay (*Lat. 34° 11′ S., Long. 22° 09′ E.*) is situated on rising ground southward of the harbour. In 1949, the population consisted of 10,000 of all races, of whom 5,000 were white.

There is a hospital, with 14 beds, situated on the hill above the town.

In the year 1949, 235 vessels visited the port.

Communications.—Mossel bay is connected to the general railway system, and there is regular communication by sea and air with other South African ports.

Climatic table, *see* page 66.

Charts 2083, 2084.

MOSSEL BAY TO KNYSNA HARBOUR.—Aspect.—Between Cape St. Blaize and Knysna harbour, about 45 miles eastward, the coast is backed by the Outeniqua range of mountains, some peaks of which rise to elevations of over 5,000 feet (1,524^{m}0), and which lies nearly parallel to the coast at from 7 to 15 miles inland. Numerous

Charts 2095, 2202a, 748a, 2203, 2483.

Charts 2083, 2084.

small rivers of no navigable importance rise in this range, and, before entering the sea, form deep channels in the high plateaux which extend to the sea coast. *See* view of Cradock berg and the Outeniqua mountains facing page 115.

Between the town of George (*Lat. 33° 58′ S., Long. 22° 28′ E.*), about 16 miles east-north-eastward of the mouth of Little Brak river, and the entrance to Knysna river, several lakes are situated about 2 miles inland behind the coastal hills; the land northward of these lakes, which rises to elevations of 700 and 800 feet ($213^{m}4$ and $243^{m}8$), is fertile and partially cultivated, with many scattered small clumps of trees, which are prominent.

Coast.—Great Brak river enters the sea about 5 miles east-north-eastward of the mouth of Little Brak river. Here the coast is formed of sandy hillocks of from 80 to 150 feet ($24^{m}4$ to $45^{m}7$) high, mostly covered with scrub, while the beach is sandy and fringed with rocks which dry. About 3 miles eastward, the sandy hillocks cease, and the coast becomes steep for about 2½ miles to the mouth of Maalgaten (Mal Gat) river, a stream which enters the sea between high cliffs, its mouth frequently being choked with sand; the water in this river is dark red in colour.

Dutton cove, a slight indentation in which there is a rocky islet, is situated about 4 miles eastward of the mouth of Maalgaten river; the intervening coast is rocky and unapproachable, and Brakkefontein (Brak Fontein) hill rises to an elevation of 722 feet ($220^{m}1$) close within it. About 1¼ miles eastward of Maalgaten river mouth, there is a conspicuous group of rocks about 1½ cables offshore.

Gwayang (Gayang) river, close eastward of Dutton cove, often has its mouth closed and its water is of the same dark colour as that of Maalgaten river.

Chart 2084.

Between the mouths of Gwaygang river and Kaaimansrivier (Cayman river), 7½ miles north-eastward, the coast is rocky and unapproachable. Schaapkops and Mill rivers enter the sea between these points, the latter flowing between steep and wooded hills into Christina bay; the shore of this bay is a beach of large, smooth stones on which no landing is possible.

Victoria bay, half a mile eastward of Christina bay, is shallow and has a sandy beach where landing may be effected at times, but only small boats should attempt to enter the bay. Kaaimansrivier is fordable within a mile from its mouth, where it is joined by Zwart river.

From the mouth of Kaaimansrivier, the coast trends east-south eastward for about 11 miles to Gericke point. A sandy beach, fringed with rocks which dry, and backed by a ridge of irregular sandhills, extends for 3½ miles eastward of the mouth of Kaaimansrivier, at which point the sandhills become stony and finally merge into bare, rocky cliffs of a reddish colour and about 500 feet ($152^{m}4$) high about 2 miles westward of Gericke point. Touws (Touw) river, a small stream with its mouth closed, flows through the beach about one mile eastward of the mouth of Kaaimansrivier.

Gericke point (*Lat. 34° 02′ S., Long. 22° 46′ E.*) is the western entrance point of a small bay with an apparently foul bottom; a rocky islet lies southward of Gericke point with several rocks outside it; all the latter dry and are within half a mile of the point.

Charts 2095, 596, 2202a, 748a, 2203, 2483.

Chart 2084.

The cliffs terminate three-quarters of a mile northward of Gericke point, thence about 9 miles east-south-eastward to the mouth of Goukama (Goukamma) river, the coast is a sandy beach interspersed with patches of rock and backed by irregular hillocks from 200 to 300 feet ($61^{m}0$ to $91^{m}4$) high. About 1½ miles eastward of Gericke point, Swart (Zwart) river drains through the sand at certain seasons, its mouth being always closed. At the so-called mouth, the sand is conspicuously white and bare for about one mile. Within the coast, about 3 miles north-eastward of this white sand, the land rises somewhat abruptly to a height of 1,110 feet ($338^{m}3$), presenting a smooth, green appearance with scattered clumps of trees.

Goukama river is remarkable for the suddenness with which it rises after rains, and the depth it then attains. It is about a cable wide for 4 miles within its mouth, but the latter is completely choked by sand for long periods during the dry season.

In bad weather, the coast between Gericke point and the mouth of Goukama river is fringed with heavy detached breakers which extend upwards of one mile offshore.

Obstruction.—In 1910, the Norwegian barque *Seier* struck a submerged object in this vicinity; in 1915, the S.S. *Clara* reported having observed broken water in the position indicated on the chart about 4 miles south-south-eastward of Swart river mouth.

Chart 1224.

Coast.—Bank.—About 1½ miles east-south-eastward of the mouth of Goukama river is a double-pointed headland, the eastern extreme of which is Walker point. Rocks with depths of less than 6 feet ($1^{m}8$), on which the sea constantly breaks, extend for over half a mile southwestward of the western extreme, and a chain of rocks, both sunken and awash, extends south-south-eastward for about half a mile from Walker point (*Lat. 34° 05′ S., Long. 22° 59′ E.*).

A small rocky and sandy bay lies between the two points, but the whole of the vicinity is foul.

The land adjacent to Walker point consists of sparsely-covered hillocks backed by undulating ridges which rise, at about 2 miles inland, to bare grassy hills about 900 feet ($274^{m}3$) high.

From Walker point, the coast trends eastward for about 3½ miles to the headland which forms the western entrance point to Knysna river, between which points lies Buffalo bay. This bay has not been closely examined, but during north-westerly winds, small vessels may find sheltered anchorage about 5 cables north-eastward of Walker point and a similar distance offshore, in depths of from 5 to 8 fathoms ($9^{m}1$ to $14^{m}6$), blue clay; nearer the point the bottom is rocky. Should the wind back to southward of west, vessels should put to sea immediately, as a breaking sea then sets in.

Chart 2084.

Dalgleish bank, with depths of from 14 to 17 fathoms ($25^{m}6$ to $31^{m}1$), coral, lies about 6 miles southward of Walker point.

Chart 1224.

KNYSNA HARBOUR.—Aspect.—Two steep and rocky headlands, about a mile eastward of Buffalo bay, form the entrance to Knysna river; the flagstaff and a white pilot house, which are situated on the eastern headland, are prominent.

Charts 2095, 596, 2202a, 748a, 2203, 2483.

A black can buoy, moored about a quarter of a cable north-north-eastward of Green point, the eastern point of Best cove, and a red conical buoy moored less than three-quarters of a cable northward of the same point, mark the southern and northern sides, respectively, of the narrow channel in this vicinity ; a second red conical buoy moored westward of Leisure island (*Lat. 34° 04′ S., Long. 23° 04′ E.*) about 2¼ cables north-westward of Spit beacon, marks the eastern side of the channel.

Tidal streams.—The in-going stream, setting strongly towards Needles point from south-eastward, runs thence directly through the entrance. The out-going stream, from abreast Green point set directly towards Fountain point and the shore close southward of it. It then sets through the channel, but bears eastward unless there is a strong west-going current outside, in which case it sets directly seaward.

With a heavy sea on the bars, near high and low water, large quantities of water flow towards Emu rock, and thence strongly out again close to the western shore and outside the inner bar. It is therefore advisable, before attempting to cross the bars with a breaking sea, to wait until the in-going stream has made at least two hours, at which time the stream and the breakers are acting together, and no cross-set is experienced.

Anchorages.—Vessels visiting Knysna secure alongside New jetty as there is no swinging room at moorings anywhere in the river for any but a small vessel. If necessary, a vessel could be moored head and stern in the widest part of the channel, abreast the north-western end of Leisure island. There is no danger in grounding in any part of the river as the bottom is soft.

Vessels waiting for the tide to cross the bars may in moderate weather find anchorage off the entrance in depths of from 12 to 15 fathoms (21^{m}9 to 27^{m}4), blue clay, but it is more advisable to remain underway until the bar is passable, especially as in unsettled weather a heavy sea frequently sets in from the south-westward, with little or no warning.

Directions.—Owing to the heavy breakers across the entrance, the harbour is by no means easy of access to small and low-powered vessels.

The best time for power vessels to enter is a little before high water, and it is not advisable to enter or leave during the period of the out-going stream especially if there are breakers on the bars. If the harbour is entered in the early forenoon before the sun is high, the sandspit and the channel can easily be distinguished by the colour of the water.

To avoid the breakers off Needles point, the entrance should be approached on a course slightly eastward of the alignment of the approach leading beacons, which in line bear 005°, until nearly abreast Needles point, when course may be shaped to pass midway between Inner Obelisk point and the islet opposite to it.

The front beacon on Fountain point (*Lat. 34° 05′ S., Long. 23° 04′ E.*) and the rear beacon on Leisure island were reported, in 1947, to be prominent marks. Should the latter not be seen, course should be shaped to pass close to the western shore, as, even when the breakers are at their worst, there is frequently a strip of unbroken water on the western side of the entrance.

After passing Inner Obelisk point, course may be altered gradually westward, so as to bring Fountain point beacon astern when about to pass the black buoy marking the south-western side of the channel,

Chart 1224.

northward of Green point. Care is necessary to avoid being swept past Fountain Point beacon by the tide which is strong in the entrance. The black buoy may be rounded close-to, and the vessel headed towards Best cove, where a pilot is embarked.

The turn round the black buoy into Best cove should be commenced in ample time, as the in-going tidal stream runs very strongly round Black point, and difficulty might otherwise be experienced in hauling round sufficiently to avoid the extremity of the sandspit south-westward of Leisure island, the position of which is marked by a red buoy.

From Best cove to Monkey point the channel is narrow but deep, and runs nearly parallel with the western bank which may be kept close until on the line of New eastern and New western leading beacons, when they should be steered for, the rear beacon being kept slightly open north-eastward of the front beacon, as stated above. This course will lead south-westward of Spit beacon and the second red buoy marking the north-eastern side of the channel, to the line of the leading beacons situated about 4½ cables north-westward of Monkey point; course should then be shaped to bring them in line astern, bearing 186°, which line leads to New jetty and should be carefully followed.

Vessels leaving just before low water are advised not to close the eastern shore, owing to the out-going tidal stream setting towards the rocks between Fountain and Inner Obelisk points.

Jetties.—New jetty extends from the western side of Paarden island (*Lat. 34° 03′ S., Long. 23° 03′ E.*) and is 400 feet (121^{m}9) in length, with a depth alongside of 12 feet (3^{m}7) close to the piles, but the bottom shelves steeply to a depth of 19 feet (5^{m}8). The jetty is served by a narrow gauge railway which runs on the causeway connecting Paarden island to the mainland.

Town jetty extends from the mainland south-westward of the town and has depths of from 12 to 13 feet (3^{m}7 to 4^{m}0) alongside, but it is not used.

A mooring buoy is moored in the channel abreast New jetty.

Knysna.—Port facilities.—The town of Knysna is divided into Newhaven, situated on the eastern side of the river about 3 miles from the entrance, and Belvidere on the opposite bank. The climate is extremely healthy.

In 1951, the population consisted of 7,347, of whom 3,058 were Europeans.

Fresh provisions are plentiful at all seasons and water can be obtained at New jetty, but there are no stocks of coal or fuel oil.

Small repairs can be undertaken by a local firm possessing a small electric welding plant.

Knysna is connected to the general railway system of the Union of South Africa.

Life-saving.—There is a line-throwing apparatus at the pilot signal station.

Chart 2084.

KNYSNA RIVER TO CAPE RECIFE.—Coast.—Light.—From the entrance to Knysna harbour to the mouth of Noetzie (Nütze) river 3 miles eastward, the coast consists of rugged red cliffs, from 200 to 300 feet (61^{m}0 to 91^{m}4) high, with patches of shingle beach and points fringed with off-lying rocks, the latter extending as much as 5 cables

Charts 2095, 1013, 596, 2202a, 748a, 2203, 2127, 2483.

Chart 2084.

The locality may also be identified by Spitzkop mountain, 3,061 feet (933^{m}0) high, and the five paps eastward of it, which are situated about 10 miles north-north-eastward of the entrance, and by Krantzhoek, 9 miles eastward of the entrance and less than a mile inland, fronted by a bluff 554 feet (168^{m}9) high, rising steeply from the sea.

Chart 1224.

Between Needles point (*Lat. 34° 05′ S., Long. 23° 04′ E.*), the eastern extremity of the western headland, and the rocks lying between the Mewstone, 3½ cables east-south-eastward, and Outer Obelisk point, 2¼ cables east-north-eastward, respectively, of Needles point, the entrance is about 1¼ cables in width; abreast Inner Obelisk point, 2½ cables north-north-eastward of Needles point, the channel narrows to about three-quarters of a cable. *See* view on chart 1224.

Within the entrance, the western bank of the river is steep for about 1½ miles north-westward, when it becomes flat and fronted with mud-flats, covered in places with grass and weeds, through which there are narrow channels. The eastern headland, curving north-eastward about 4 cables within the entrance, forms a large area which is mostly mud flats, dry at low water, and has within it Leisure (Steinbok) and Paarden islands. These islands are low, and where not built over, are covered with bush and grass and surrounded by boat channels; on Paarden island there is a large timber factory with two prominent chimneys. A stone causeway connects Paarden island with the mainland northward of it, on which is situated the town of Knysna. A low viaduct, carrying the railway line connecting Knysna with George (page 116) runs south-westward across the inner part of the harbour from the vicinity of the old jetty, charted as lying about 3 cables north-westward of the town jetty (page 121).

Dangers.—Depths.—Black rocks, a group of above-water and sunken rocks, on which the sea always breaks, extend 1¼ cables southward of the extremity of the western headland. The Mewstone, a detached rock with several other rocks between it and the coast northward of it, lies about 1¼ cables southward of the eastern entrance point; South-east rocks, another group of above-water and sunken rocks, lies about 4 cables south-eastward of the Mewstone.

Emu rock, with a depth of 4 feet (1^{m}2) over it, and on which the sea does not always break, lies on the inner bar, about 1½ cables southward of Inner Obelisk point.

The outer bar, which extends approximately from Black rocks to the Mewstone, had, in 1947, a least depth of 17½ feet (5^{m}3) over it, and the inner bar, which extends from Ship head to Emu rock, had, in 1947, a least depth of 13½ feet (4^{m}1) over it. The bottom is sand and mud and the sea breaks over the bars, not only in bad weather, but when even a moderate southerly wind opposes the out-going stream.

Within the bars the river deepens and, in 1947, it was reported that a depth of 16½ feet (5^{m}0) could be carried in the navigable channel as far as New jetty on the western side of Paarden island, and vessels that can cross the bars can proceed to this berth, while boats can ascend the river for about 9 miles. Owing to sandbanks, the width of the navigable channel nowhere greatly exceeds one cable, and is considerably less in places. Above Best cove, about half a mile within the entrance, the navigable channel is subject to change.

Charts 2095, 596, 2202a, 748a, 2203, 2483.

Chart 2084.

Port limits.—Port regulations.—The limits of the port under the Harbour Authorities are as follows:—The area included within a line drawn from Walker point to a point at sea bearing 180°, 3 miles; from that point to another point bearing from it 090°, 7·5 miles; and from the last named position to the western entrance point of Noetzie (Nütze) river, bearing 000°, 3·8 miles.

Also the whole area of tidal waters of Knysna river.

The General Regulations for the Harbours of the Union of South Africa are in force at Knysna.

Chart 1224.

Pilots.—Pilot signals.—Pilotage is compulsory for merchant vessels from Best cove to New jetty. The pilot at Knysna does not board vessels outside the bars, but embarks at Best cove.

Vessels about to embark a pilot should not stop their engines until they are sure of clearing the sand spit on the eastern side of the channel south-westward of Leisure island (*Lat. 34° 04′ S., Long. 23° 04′ E.*).

The following signals are made from the pilot station:—

1. Yellow flag . . .	Pilot boat is ready to receive vessel at Best cove.
2. Black ball at the gaff .	Bar is passable; vessels can enter.
3. Black ball half way up .	Caution is necessary.
4. Blue pendant with white centre at the masthead .	Bar is impassable.
5. A white square flag hoisted near the signal station .	No fishing or pleasure boats are allowed to cross the bar.

Beacons.—Buoys.—A white stone beacon on a large rock, 30 feet ($9^{m}1$) high, is situated on Fountain point, on the eastern side of the entrance, about 1½ cables northward of Inner Obelisk point.

A beacon consisting of a white iron column, surmounted by two red triangles, is situated on Leisure island, about 4 cables northward of the above beacon. These two beacons in line, bearing 005°, lead over the outer bar and westward of Emu rock.

A white beacon surmounted by a disc, and a red beacon surmounted by a triangle, and about a cable north-westward of the white beacon, are situated on the western bank of the river, about 9 cables north-westward of Monkey point, which is on the west bank, about 6 cables north-westward of Fountain point. These beacons, the charted positions of which are approximate, are known as New eastern and New western beacons, and, in line, bearing about 309°, they led, in 1947, from northward of Best cove to the line of the third pair of leading beacons described below. In 1932, it was found that the rear beacon should be kept slightly open north-eastward of the front beacon.

A third pair of leading beacons is situated on the western bank of the river about 4½ cables north-westward of Monkey point. These two beacons, in line bearing 186°, lead through the channel to abreast of New jetty. In 1925, the least depth on this leading line was 17 feet ($5^{m}2$).

Spit beacon, a white spar surmounted by a white split disc, is situated on the eastern side of the channel westward of Leisure island about 1¾ cables northward of Monkey point (*Lat. 34° 04′ S., Long. 23° 04′ E.*).

Charts 2095, 596, 2202a, 748a, 2203, 2483.

Chart 1224.

A black can buoy, moored about a quarter of a cable north-north-eastward of Green point, the eastern point of Best cove, and a red conical buoy moored less than three-quarters of a cable northward of the same point, mark the southern and northern sides, respectively, of the narrow channel in this vicinity ; a second red conical buoy moored westward of Leisure island (*Lat. 34° 04′ S., Long. 23° 04′ E.*) about 2¼ cables north-westward of Spit beacon, marks the eastern side of the channel.

Tidal streams.—The in-going stream, setting strongly towards Needles point from south-eastward, runs thence directly through the entrance. The out-going stream, from abreast Green point set directly towards Fountain point and the shore close southward of it. It then sets through the channel, but bears eastward unless there is a strong west-going current outside, in which case it sets directly seaward.

With a heavy sea on the bars, near high and low water, large quantities of water flow towards Emu rock, and thence strongly out again close to the western shore and outside the inner bar. It is therefore advisable, before attempting to cross the bars with a breaking sea, to wait until the in-going stream has made at least two hours, at which time the stream and the breakers are acting together, and no cross-set is experienced.

Anchorages.—Vessels visiting Knysna secure alongside New jetty as there is no swinging room at moorings anywhere in the river for any but a small vessel. If necessary, a vessel could be moored head and stern in the widest part of the channel, abreast the north-western end of Leisure island. There is no danger in grounding in any part of the river as the bottom is soft.

Vessels waiting for the tide to cross the bars may in moderate weather find anchorage off the entrance in depths of from 12 to 15 fathoms ($21^{m}9$ to $27^{m}4$), blue clay, but it is more advisable to remain underway until the bar is passable, especially as in unsettled weather a heavy sea frequently sets in from the south-westward, with little or no warning.

Directions.—Owing to the heavy breakers across the entrance, the harbour is by no means easy of access to small and low-powered vessels.

The best time for power vessels to enter is a little before high water, and it is not advisable to enter or leave during the period of the out-going stream especially if there are breakers on the bars. If the harbour is entered in the early forenoon before the sun is high, the sandspit and the channel can easily be distinguished by the colour of the water.

To avoid the breakers off Needles point, the entrance should be approached on a course slightly eastward of the alignment of the approach leading beacons, which in line bear 005°, until nearly abreast Needles point, when course may be shaped to pass midway between Inner Obelisk point and the islet opposite to it.

The front beacon on Fountain point (*Lat. 34° 05′ S., Long. 23° 04′ E.*) and the rear beacon on Leisure island were reported, in 1947, to be prominent marks. Should the latter not be seen, course should be shaped to pass close to the western shore, as, even when the breakers are at their worst, there is frequently a strip of unbroken water on the western side of the entrance.

After passing Inner Obelisk point, course may be altered gradually westward, so as to bring Fountain point beacon astern when about to pass the black buoy marking the south-western side of the channel,

Charts 2084, 2095, 596, 2202a, 748a, 2203, 2483.

Chart 1224.

northward of Green point. Care is necessary to avoid being swept past Fountain Point beacon by the tide which is strong in the entrance. The black buoy may be rounded close-to, and the vessel headed towards Best cove, where a pilot is embarked.

The turn round the black buoy into Best cove should be commenced in ample time, as the in-going tidal stream runs very strongly round Black point, and difficulty might otherwise be experienced in hauling round sufficiently to avoid the extremity of the sandspit south-westward of Leisure island, the position of which is marked by a red buoy.

From Best cove to Monkey point the channel is narrow but deep, and runs nearly parallel with the western bank which may be kept close until on the line of New eastern and New western leading beacons, when they should be steered for, the rear beacon being kept slightly open north-eastward of the front beacon, as stated above. This course will lead south-westward of Spit beacon and the second red buoy marking the north-eastern side of the channel, to the line of the leading beacons situated about 4½ cables north-westward of Monkey point; course should then be shaped to bring them in line astern, bearing 186°, which line leads to New jetty and should be carefully followed.

Vessels leaving just before low water are advised not to close the eastern shore, owing to the out-going tidal stream setting towards the rocks between Fountain and Inner Obelisk points.

Jetties.—New jetty extends from the western side of Paarden island (*Lat. 34° 03′ S., Long. 23° 03′ E.*) and is 400 feet (121^{m}9) in length, with a depth alongside of 12 feet (3^{m}7) close to the piles, but the bottom shelves steeply to a depth of 19 feet (5^{m}8). The jetty is served by a narrow gauge railway which runs on the causeway connecting Paarden island to the mainland.

Town jetty extends from the mainland south-westward of the town and has depths of from 12 to 13 feet (3^{m}7 to 4^{m}0) alongside, but it is not used.

A mooring buoy is moored in the channel abreast New jetty.

Knysna.—Port facilities.—The town of Knysna is divided into Newhaven, situated on the eastern side of the river about 3 miles from the entrance, and Belvidere on the opposite bank. The climate is extremely healthy.

In 1951, the population consisted of 7,347, of whom 3,058 were Europeans.

Fresh provisions are plentiful at all seasons and water can be obtained at New jetty, but there are no stocks of coal or fuel oil.

Small repairs can be undertaken by a local firm possessing a small electric welding plant.

Knysna is connected to the general railway system of the Union of South Africa.

Life-saving.—There is a line-throwing apparatus at the pilot signal station.

Chart 2084.

KNYSNA RIVER TO CAPE RECIFE.—Coast.—Light.—From the entrance to Knysna harbour to the mouth of Noetzie (Nütze) river 3 miles eastward, the coast consists of rugged red cliffs, from 200 to 300 feet (61^{m}0 to 91^{m}4) high, with patches of shingle beach and points fringed with off-lying rocks, the latter extending as much as 5 cables

Charts 2095, 1013, 596, 2202a, 748a, 2203, 2127, 2483.

Chart 2084.

from the coast in places. Above the cliffs, the land rises steeply to an elevation of over 700 feet (213^{m}4) and, close to the mouth of Noetzie river, groups of trees become frequent and larger.

Noetzie river is small and unimportant, and enters the sea through a small sandy beach between high wooded hills, its mouth often being entirely closed.

A characteristic appearance is given to the coast lying between Noetzie river and Cape Seal, about 14½ miles eastward, by several large peaked rocks, some bare, others covered with vegetation, which rise from the sea close in front of the cliffs and occasionally equal the latter in height.

For 3 miles eastward of Noetzie river the cliffs are precipitous, and the land within them, rising steeply to an elevation of about 900 feet (274^{m}3), is inaccessible, being completely covered with dense forest from the edge of the cliffs to about 3 miles inland.

A deep gorge separates this forest from Krantzhoek, described on page 118, eastward of which, the land within the cliffs presents its usual smooth, green appearance with occasional scattered clumps of trees.

Cape Seal (*Lat. 34° 06′ S., Long. 23° 25′ E.*) is the extremity of a peninsula with rugged and overhanging cliffs, which projects about 2 miles east-south-eastward from the coast. It is covered with scrubby bush and a gap in its cliffs near the mainland gives it the appearance of an island from many points of view. A large mass of rock, 123 feet (37^{m}5) high, is situated off its southern side to which it is connected by a narrow sandy isthmus.

A light is exhibited on Cape Seal, at an elevation of 474 feet (144^{m}5), from a steel framework tower 20 feet (6^{m}1) high, carrying a yellow circular daymark 6 feet (1^{m}8) in diameter.

Danger.—Whale rock, with a depth of 4 feet (1^{m}2) over it, and over which the sea does not always break, lies nearly 4 cables east-south-eastward of Cape Seal. A 3¼-fathom (5^{m}9) patch lies about one cable north-westward of Whale rock, but on its south-eastern side, the rock is steep-to.

The southern end of the long sandy beach southward of Pisang river, bearing about 280° and open northward of Cape Seal peninsula, leads northward of Whale rock.

The passage between Whale rock and Cape Seal should not be attempted.

Plettenberg bay.—This bay is entered between Cape Seal and Komkromma point, about 9 miles north-eastward. About 3½ miles north-north-westward of Cape Seal, Pisang river enters the bay, and at its mouth, which is small and frequently closed, stands Beacon islet, a rocky islet, sparsely covered with brush, on the summit of which is a prominent flagstaff. Plettenberg is a summer seaside resort.

Keurbooms river, the largest river on this part of the coast, rises in the Outeniqua range and enters the sea about half a mile northward of Beacon islet. Within its entrance it runs parallel with the coast, separated from the sea by a narrow strip of sand, and such an area is covered by the tide, that at high water it appears to be a large river. It is navigable for boats for about 8 miles above its mouth, but the bar is only passable under favourable circumstances.

Between Keurbooms river entrance and the mouth of Drooge river,

Charts 2095, 596, 2202a, 748a, 2203, 2483.

Chart 2084.

5 miles north-eastward, there is a sandy beach within which are sandhills, sparsely covered with bush ; a heavy sea continuously breaks on this beach and no landing should be attempted there.

From the mouth of Drooge river to the mouth of Matjes river, about one mile eastward, and thence 3½ miles eastward to Komkromma point, the coast is rocky with occasional sandy beaches, and fringed with off-lying rocks, of which the outermost group lies about 2½ cables offshore and 1½ miles eastward of the entrance to Matjes river (*Lat. 34° 00′ S., Long. 23° 28′ E.*).

The mouths of both Drooge and Matjes rivers are frequently closed with sand ; the latter enters the sea between high, precipitous and wooded hills, and there are two detached rocks, 50 feet ($15^{m}2$) high, close eastward of its entrance.

Vessels should not approach this part of the coast within a distance of 2 miles.

Anchorage.—Plettenberg bay constitutes about as good an anchorage as any other bay on the south coast of Africa, having regard to the shelter afforded, the good holding ground, and the suitable depths at a short distance from the shore, and vessels may obtain shelter here when the sea is too high for either Mossel bay or Knysna River bar.

Like other bays on this coast, however, it is exposed to the full force of south-easterly gales, and vessels should always be prepared to quit the anchorage on any indication of one of these gales.

There are no off-lying dangers in entering or leaving the bay, except Whale rock, which should be given a berth of about one mile.

Vessels seeking shelter from westerly gales should anchor in the south-western corner of the bay, in a depth of about 8 fathoms ($14^{m}6$), sand, with the gap in Cape Seal peninsula bearing 198°, and the extremity of Cape Seal bearing 134°.

Owing to the surf, landing is not always practicable, but the best landing place is on the beach situated close northward of Beacon islet, which is partially sheltered by a rocky ledge about 2½ cables eastward of the islet ; the ledge covers at high water, springs.

Signal station.—A signal station, with a white mast and a white hut, is situated about one mile west-north-westward of Beacon islet.

Plettenberg bay to Cape Recife.—**Aspect.**—Between Komkromma point and Tsitsikama (Zitzikamma) point, about 49 miles eastward, the Outeniqua range of mountains lies parallel to the coast from 4 to 12 miles inland ; the range contains several well-defined peaks, described below, which, from their appearance are very conspicuous. Formosa peak, 5,500 feet ($1,676^{m}4$), lying about 12 miles north-eastward of Komkromma point, is the highest and most remarkable of these peaks, and Thumb peak, about 4,675 feet ($1,424^{m}9$), so called from its shape, lies about 4 miles west-north-westward from Formosa peak. Between Formosa peak and the coast is Grenadiers Cap, so named on account of its appearance. Witelsbos (Witte Els berg), 4,111 feet ($1,253^{m}0$), about 19 miles eastward of Grenadiers Cap, is a pyramidal peak, which, when seen from eastward or westward, presents a flat top. Karredouwsberg (Karedouw peak) (*Lat. 33° 59′ S., Long. 24° 19′ E.*) is saddle-shaped when seen from southward, but from other bearings appears to have a flat top. *See* view facing page 115.

About 7 miles northward of Tsitsikama point, the Outeniqua range

Charts 2095, 596, 2202a, 748a, 2203, 2483.

Chart 2084.

terminates very conspicuously in a sharp conical peak 1,634 feet ($498^{m}0$) high, which slopes steeply to the plain extending to the shores of St. Francis bay.

Chart 2085.

About 25 miles north-eastward of Cape St. Francis, the Elands Rivier range and the Van Staadens range are also conspicuous. The former range has three peaks, of which the north-western peak, Stinkhoutberg, 3,615 feet ($1{,}101^{m}8$), is the highest, and the latter range terminates abruptly in Brak River hill, 2,005 feet ($611^{m}1$) high, a remarkable double peak about 5½ miles inland.

In clear weather, Mount Cockscomb, 37 miles northward of Cape St. Francis and 5,777 feet ($1{,}760^{m}8$) high, is a conspicuous object.

Chart 2084.

Coast.—The dangerous coast between Komkromma point and Cape St. Francis has been the scene of several wrecks, as the proximity to the coast of the mountain ranges, and the prevailing winds, occasionally cause dense fogs, and there is said to be an indraught.

About half a mile northward of Komkromma point is the mouth of Zout (Komkromma) or Salt river, which expands into a small lake directly within its entrance. It is reported to be navigable for boats for one mile above its mouth, but the sea frequently breaks heavily off its entrance.

Groot river enters the sea about 2 miles eastward of Komkromma point (*Lat. 34° 00′ S., Long. 23° 32′ E.*) ; there is a conspicuous double peak close within its eastern entrance point.

From the mouth of Groot river to Aasvogel point, 37 miles east-south-eastward, the coast consists of perpendicular rocky cliffs from 300 to 600 feet ($91^{m}4$ to $182^{m}9$) high, intersected by several streams, none of which are navigable ; there are several dangers at a short distance offshore.

The mouth of Klip (Blue rock) river, 2 miles eastward of the mouth of Groot river, may be distinguished by the cliffs on its eastern side being bare, perpendicular and fringed with white rocks, while the cliffs between these two rivers are crowned with thickly wooded hills.

From the mouth of Klip river to Storm point, 15 miles east-south-eastward, numerous streams run through deep ravines in the wooded hills ; Wall point, a white point, 11 miles eastward of the mouth of Klip river and so called on account of its perpendicular appearance, is conspicuous.

About 4 miles eastward of Wall point, Storms river flows through a gap between cliffs about 600 feet ($182^{m}9$) high. The entrance is about a quarter of a cable wide, and partially sheltered by low, shelving rocks on the western side ; under favourable circumstances, landing may be effected close inside the eastern entrance point, the shore of which is fringed with rocks awash.

Off-lying dangers.—A bank of small extent, over which there is a depth of 13 fathoms ($23^{m}8$), lies about 1¾ miles south-westward of the entrance to Storms river ; the bank is composed of rock and sand, and the sea breaks over it in heavy weather.

In 1948, an unconfirmed report stated that a rock or reef existed in a position about 3 miles south-westward of Tsitsikama point.

A coral bank of small extent, with a least depth of 16 fathoms ($29^{m}3$), lies about 5 miles southward of the mouth of Tsitsikama river.

Charts 2095, 596, 2202a, 748a, 2203, 2483.

Chart 2084.

Coast.—Eastward of the mouth of Storms river the cliffs are not so thickly wooded, though the banks of the numerous rivers are covered with dense bush. Faure river enters the sea about 5 miles eastward of the mouth of Storms river ; about 2 miles westward of the mouth of the former river, a sunken rock lies about 2½ cables offshore, and about one mile southward of its entrance, a sunken reef, over which the sea breaks in bad weather, extends for more than a mile parallel with the coast.

The mouth of Elands river, about 3½ miles eastward of the mouth of Faure river, may be recognised by some white rocks close within its eastern entrance point.

From the mouth of Elands river (*Lat. 34° 03′ S., Long. 24° 05′ E.*) to Aasvogel point, about 12 miles east-south-eastward, the coast is fringed with rocks, sunken and awash, which extend in places as much as 3 cables offshore. Robhoek point, 2½ miles eastward of the mouth of Elands river and the entrance to Witte Els river, midway between the mouth of Elands river and Aasvogel point, are both within this stretch of coast ; the cliffs are nearly perpendicular one mile eastward of the former, while a sandy beach extends for 1½ miles eastward from the latter, the beach being fringed with a rocky ledge which covers at half tide and terminates in a high rock. Aasvogel point may be identified by a strip of sand half a mile in width, which lies within the point, the cliffs of which are 660 feet (201^{m}2) high.

From Aasvogel point to Tsitsikama point, about 9 miles east-south-eastward, the coast trends east-south-eastward forming a bight in which are numerous sandy beaches ; the mouth of Tsitsikama river lies about 7 miles east-south-eastward of Aasvogel point, and its position may be identified by some sandcliffs, about one mile in extent, at its north-western entrance point, within which the hills rise to an elevation of 748 feet (228^{m}0), the land on its south-eastern bank being considerably lower.

Between the mouth of Tsitsikama river and Tsitsikama point, the coast is fringed with rocks and backed by numerous grassy ridges through which several streams enter the sea.

Tsitsikama point is low and shelving, with rocks and breakers extending as much as 8 cables southward of the point. The coast thence to Wreck point, about 5 miles east-south-eastward, consists of bushy hillocks from 50 to 120 feet (15^{m}2 to 36^{m}6) high, rising to an elevation of 603 feet (183^{m}8) about 2 miles inland, and fringed with rocks and breakers extending about 5 cables offshore. Two rocks awash lie close off Wreck point, and there is a prominent peak 592 feet (180^{m}4) high, on a ridge about one mile northward of the point.

Landing.—Landing can sometimes be effected about half a mile eastward of Wreck point, where there is a cove, formed by a ledge of rocks the eastern part of which is awash at low water. Long shelving rocks and big boulders which dry, lie within the cove, and there is a small sandy beach on its western side.

Coast.—Klippen point is a rocky point, 30 feet (9^{m}1) high, about 2 miles eastward of Wreck point (*Lat. 34° 11′ S., Long. 24° 36′ E.*). A reef, on which are some detached rocks, the highest of which is 13 feet (4^{m}0) high, extends 6½ cables south-eastward of the point, and the sea breaks heavily outside the reef.

Slang bay is entered between Klippen point and Thys point, about

Charts 2095, 596, 2202a, 748a, 2203, 2483.

Chart 2084.

5½ miles eastward. For about 3 miles north-eastward of Klippen point, the shore of the bay consists of low, sandy cliffs from 30 to 50 feet (9^{m}1 to 15^{m}2) high, within which bare sandhills rise to an elevation of from 200 to 300 feet (61^{m}0 to 91^{m}4) ; thence east-south-eastward to Thys point the shore is rocky, and consists of rocky cliffs, from 10 to 20 feet (3^{m}0 to 6^{m}1) high, within which are wooded hills rising to 250 feet (76^{m}2) high. A heavy surf fringes the shore, but the bay is apparently free from rocks except within about half a mile north-eastward of Klippen point.

Slangrivier and Klipdrift river flow through the shore at the head of the bay, within which the land rises gradually to a grassy ridge 569 feet (173^{m}4) high.

White point, about 2 miles east-south-eastward of the mouth of Klipdrift river, has a small cove about three-quarters of a mile eastward of it ; the cove is formed by a rocky ledge lying parallel with the shore, but it is encumbered with boulders. It is stated that under favourable circumstances, landing from a boat is possible at high water, when the boulders cover.

Thys point is 50 feet (15^{m}2) high, with sunken rocks extending as much as 3 cables south-eastward of the point. Close eastward of Thys point is Thys bay, a small sandy bight apparently free from rocks and backed by low, sandy hillocks. At the eastern end of the bay is a sandhill, 366 feet (111^{m}6) high, its summit partially covered with bush ; the sand here is blown inland for a distance of 2 miles, forming a conspicuous stripe when seen from seaward.

From Thys bay to Seal point, about 5 miles east-south-eastward, the coast is rocky and rugged, the cliffs being surmounted with grass. Scholtz Kraal, about 2 miles eastward of Thys bay, is an indentation in the cliffs with a small waterfall at its head, and rocks awash extending as much as 3 cables offshore. From Thys bay to a rocky bight, 1¼ miles eastward of Scholtz Kraal, the cliffs vary in height from 50 to 110 feet (15^{m}2 to 33^{m}5) ; thence to Seal point they decrease in height, and the coast near Seal point presents a low line of rugged cliff from 10 to 30 feet (3^{m}0 to 9^{m}1) high.

Charts 2084, 2085.

Seal point.—Dangers.—Light.—Fog signal.—Signal station.—Seal point is low and rocky with three rocks nearly awash lying close off the extreme of the point.

A reef with a least depth of 16 feet (4^{m}9), over which the sea generally breaks, lies about 4 cables south-eastward of Seal point (*Lat. 34° 13′ S., Long. 24° 50′ E.*), and foul, rocky ground extends off the point for about 12 cables in the same direction.

A light, known as Cape St. Francis light, is exhibited, at an elevation of 118 feet (36^{m}0), from a white cylindrical tower, 91 feet (27^{m}7) in height, situated about 1¼ cables within the extreme of Seal point. A fog signal is sounded from the lighthouse.

A signal station, connected to the general telephone system, and at which day and night watch is kept, is situated near the lighthouse.

Coast.—Aspect.—Between Seal point and Cape St. Francis, about 2 miles east-north-eastward, is a bay, the entrance points of which are rocky with large boulders, but at its head is a large sandy beach, backed by a ridge of bushy sand hillocks from 30 to 70 feet (9^{m}1 to 21^{m}3) high. The centre of this bay is clear of dangers and there is

Charts 2095, 596, 2202a, 748a, 2203, 2483.

Charts 2084, 2085.

good anchorage, fine sand bottom, with Cape St. Francis lighthouse bearing 250°, distant 9 cables. A vessel should, however, put to sea immediately on the approach of bad weather from the south or east. In calm weather landing can be effected on the sandy beach close to the north-western limit of the rocks fringing the north-eastern side of Seal point. It should not be attempted at low water, however, as dangerous surf occurs then in the shallows.

Cape St. Francis (*Lat. 34° 12′ S., Long. 24° 52′ E.*) is a very prominent point having two bushy hummocks with a bare sand ridge between them; the north-western hummock is 129 feet ($39^{m}3$) and the south-eastern hummock 123 feet ($37^{m}5$) high.

There are numerous boulders, up to 12 feet ($3^{m}7$) in height, at the extremity of Cape St. Francis, which merge into a reef consisting of rocks, both sunken and awash. This reef extends about 3 cables in a south-easterly direction and is nearly always clearly marked by breakers. There are two detached rocks, each about 10 feet ($3^{m}1$) in height, about half a cable from the high water line on the western side of the reef.

In clear weather, the position of Cape St. Francis may be indicated by Mount Cockscomb, 37 miles northward, and also by the extensive plain running inland from the coast about three or four miles northward of the cape. Humansdorp village, 11 miles north-north-westward of the cape, is conspicuous from seaward, and behind the village lie the conspicuous mountains of Kruisfontein, 2,582 feet ($787^{m}0$) and Klipfonteinberg (Rondebosch berg), 2,911 feet ($887^{m}3$) high; the former, about 7 miles north-westward of the village, has a double peak, and the latter is a sharp peak about 5½ miles north-north-eastward of the former. *See* view facing page 115.

Directions.—Caution.—Vessels should give a berth of at least 1½ miles to Seal point or keep in depths of not less than 40 fathoms ($73^{m}2$) until well past the point. If proceeding into Kromme (Krom) bay or Jeffreys (Jeffry's) bay, a similar berth should be given to Cape St. Francis.

The *red* sector of Cape St. Francis light is entered on a bearing of 225°, but, owing to a lack of sharpness in the change from *white* to *red*, the light may sometimes appear *red* near the bearing of 240°. Vessels are advised to keep in the *white* sector outside this bearing when passing Seekoe (Zeekoe) point (*see* below) at night.

Chart 2085.

Coast.—Kromme bay is entered between Cape St. Francis and Seekoe (Zeekoe) point, 100 feet ($30^{m}5$) high, and situated about 6½ miles north-north-eastward. Kromme river, at the head of the bay, and Seekoe river, half a mile south-westward of Seekoe point, flow into Kromme bay; the latter has its mouth closed by sand, and the former is not navigable and has a bar over which there is a depth of less than one foot ($0^{m}3$), and is impassable for boats. Shoal depths extend about three-quarters of a mile offshore near the mouth of Kromme river (*Lat. 34° 09′ S., Long. 24° 51′ E.*).

Seekoe point.—Danger.—Seekoe point can be identified by the range of bush-covered sandhills, which generally appear darker than the surrounding country. The highest sandhill, 100 feet ($30^{m}5$) in height, is surmounted by a white cylindrical beacon. A reef of awash and sunken rocks extends in a south-easterly direction for half a mile

Charts 2095, 596, 2202a, 748a, 2203, 2483.

Chart 2085.

from the point. Rocky foul ground, over which breakers occur in moderate weather, extends about 1½ miles further south-eastward. Vessels should not attempt to pass the point in depths of less than 12 fathoms (22^{m}0).

The shore of the bay is a sandy beach, except for the stretch for 1½ miles north-westward of Cape St. Francis, where it is rocky, rugged and backed by grassy hills ; thence for about three-quarters of a mile north-westward there are sandhills about 200 feet (61^{m}0) high, their bases fringed with rocks and boulders, which terminate at the commencement of the sandy beach, in a long ledge of boulders which dries.

Southward of the mouth of Kromme river, the sandy beach is flat and free from rocks, but between the mouths of Kromme and Seekoe rivers, rocky ledges which nearly cover at high water, project from the beach, within which rise a succession of bushy sand hillocks about 100 feet (30^{m}5) high.

Anchorage.—There is good anchorage in Kromme bay in depths of 8 or 9 fathoms (14^{m}6 or 16^{m}5), sand, with Cape St. Francis bearing 180°, distant about 2 miles, and about 1½ miles off the mouth of Kromme river. The shelter is good in westerly gales, but the bay is not safe with easterly winds ; the swell is worst with south-westerly winds.

The best landing is found at the southern end of the sandy beach, close to the long ledge of boulders, where the surf is generally low and sometimes non-existent. Although there is generally a heavy surf on the beach, landing may be effected here during westerly winds at low water, on a strip of sand between two ledges of rock.

Coast.—Between Seekoe point and Glasson (Classen) point, about 26 miles eastward, is St. Francis bay, in which there are no out-lying dangers.

Jeffreys (Jeffry's) bay is a sandy bight between two ledges of rock, situated about 1½ miles northward of Seekoe point (*Lat. 34° 05′ S., Long. 24° 55′ E.*). In fine weather, Jeffreys bay is considered to be one of the best landing places in the locality.

Noorskloof point, 1½ miles northward of Jeffreys bay, is a wooded hillock near the south-eastern end of a ridge of hills. From Noorskloof point to the mouth of Kabeljaauw (Kabeljou) river, 1½ miles northward and thence to the mouth of Gamtoos river at the head of St. Francis bay, there is a beach comparatively free of rocks. The mouth of Kabeljaauw river is closed and Gamtoos river has a bar which nearly dries, but it is deep within the bar, and the tidal influence is felt for 8 miles above the entrance ; the eastern entrance point consists of low sandhills, but the hills on the western entrance point form bluffs which are conspicuous from seaward. Within the beach between the mouths of Kabeljaauw and Gamtoos rivers, the land rises to an elevated plain. Eastward of the mouth of Gamtoos river, the bare sandhills increase considerably in height, and form conspicuous steep ridges, running parallel with the coast.

The mouth of Van Staadens river, which is closed, lies 8 miles eastward of the mouth of Gamtoos river, and may be identified by the high sandhills which form a saddle-shaped peak on its western side. On its eastern side there is a cluster of holiday rondavels. The locality may be identified by the double peak of Brak River hill, *see* page **124**.

About 1¼ miles eastward of Van Staadens river mouth, there is

Charts 2095, 596, 2202a, 748a, 2203, 2483.

Chart 2085.

a small solitary outcrop of rock just below the high water line. In 1952, close to this rock was the prominent wreck of a fishing vessel.

The mouth of Maitland river which is closed, is situated about 3¾ miles eastward of the mouth of Van Staadens river; it may be identified by the sand which extends some distance inland forming a conspicuous round hill on its western side, and by another high sand patch about one mile eastward of it. The pipeline aqueduct across the river is noticeable from a vessel close southward of the river mouth.

Eastward from the mouth of Maitland river, the nature of the coastline changes abruptly from sand to rocky ledges. Between Maitland river mouth and Seaview hotel, a large building with a tall tower close to it, about 3¼ miles east-south-eastward, there is clear water close to these ledges.

Lauries bay, about 2½ miles east-south-eastward of Seaview hotel, may be identified by its guest house and a cluster of holiday bungalows. The bay is very small and is entered between a sunken reef to the westward and a large boulder, 15 feet (4^{m}6) in height, to the eastward. The passage is generally impassable even for the smallest boat.

Charts 641, 2085.

Foul rocky ground and sunken ledges extending about 3 cables seaward exist between Lauries bay and Glasson point 2¼ miles to the eastward. Bartes bay, a reputed landing place, midway between Lauries bay and Glasson point, consists of a narrow strip of water between two ledges; the surf is normally very heavy in this vicinity. Off Glasson point, which may be identified by a fishing bungalow, a ledge of rocks 'awash' extends 2 cables offshore.

About 1¾ miles north-north-eastward of Glasson point is Lovemore hill, 690 feet (210^{m}3) in height and covered with trees, except in a clearing at the summit, where Lake Farm hotel forms a prominent mark by which it may be identified. Buffelsfontein or Botha kop, 924 feet (281^{m}6) in height, is sparsely wooded and has a bluff termination to the eastward when viewed from Algoa bay (*Lat. 33° 50′ S., Long. 25° 50′ E.*).

For about 2 miles eastward from Glasson point, there is a sandy beach known as Bushy beach. At the western end of this beach a steep bush-covered ridge, about 140 feet (42^{m}7) in height, extends for about 1¼ miles and, at the eastern end, there are a number of sand dunes, about 80 feet (24^{m}4) in height, sparsely covered with vegetation. Apart from a small clear stretch 1½ miles from Glasson point, the whole of the beach is fringed with isolated rocks, both drying and submerged, extending as much as 4 cables to seaward in places. The bottom between this beach and the 10-fathom (18^{m}3) line is rocky and very uneven.

Governor's hill, 220 feet (67^{m}1) in height, about 2 miles east-north-eastward of Glasson point, is a good mark for this vicinity, having a sharply defined tree-covered summit.

Sardinia bay, about 3½ miles eastward of Glasson point and once a small fishing boat harbour, provides the only reasonable landing place between Kabeljaauw river and Cape Recife. It is entered between a drying ledge of rocks on the south-west and Holland reef on the north-east. Landing should only be attempted at low water when the force of the breakers is broken by the exposed ledge of rocks and the approach to the sandy bay is generally calm. Holland reef, three-quarters of a mile in length, is crescent shaped and composed of drying rocks and

Charts 641, 2085.

a few above-water rocks about 5 feet (1^{m}8) in height. It lies about 2 cables offshore and a spit of drying sand extends from the shore to the middle point of the reef.

Two indentations, similar in shape to Sardinia bay, lie three-quarters of a mile and 1½ miles respectively, eastward from Sardinia bay. It is probable that landing could be affected in these bays. The easternmost of the two is known as Cannon bay.

The village of Schoenmakerskop lies about 3 miles to the eastward of Sardinia bay. It derives its name from the wooded ridge, 305 feet (93^{m}0) in height, that runs in a northerly direction from it. The largest and most noticeable building is a café painted white. There were a considerable number of new buildings in the process of construction in 1953.

Close to Club point, about 2 miles eastward of Schoenmakerskop, are two large buildings, a children's home and Port Elizabeth country club, and 1¼ miles further eastward are a cluster of holiday rondavels.

Chelsea point, about 4 miles eastward of Schoenmakerskop, is low and rocky, with two detached rocks lying close off it. Several prominent grassy hillocks rise to a height of 124 feet (37^{m}8) close within the point and some high bush covered sandhills lie parallel with the coast about three-quarters of a mile northward.

Between Chelsea point and Cape Recife, 4 miles eastward, lies Shelly bay, which affords indifferent anchorage. The shore is fringed with rocks and sunken ledges and the bottom is foul within the 10-fathom (18^{m}3) line.

Dangers.—Within the 10-fathom (18^{m}3) line between Lauries bay and Chelsea point, the bottom is generally rocky and foul, and vessels are advised to keep in depths of not less than 30 fathoms (54^{m}9).

A reef of sunken rocks extends as much as 7 cables east-south-eastward of Chelsea point.

Chart 641.

Cape Recife. — Light. — Fog signals. — Beacon. — Cape Recife is low and fringed with a sunken reef on which the sea breaks in places as much as half a mile offshore. The cape being low, Recife hillock, about 8 cables north-westward of the cape, is often seen before the lighthouse is made out. Approaching from southward during daylight, Cape Recife can be distinguished from Cape St. Francis by the difference in the colour of the lighthouse, and also by Recife hillock appearing at a distance as the termination of the coast line, a remarkable strip of bare white sand immediately westward of the hillock, appearing like a beach.

A light (*Lat. 34° 02′ S., Long. 25° 42′ E.*) is exhibited, at an elevation of 93 feet (28^{m}3), from a stone tower, 80 feet (24^{m}4) in height, painted with black and white bands, situated about a cable within the extremity of the cape. A fog signal is sounded and a radiobeacon is operated from the lighthouse.

A stone beacon, painted in black and white horizontal bands, 25 feet (7^{m}6) in height, stands about a quarter of a mile northward of the lighthouse, and, when in line with the latter, bearing about 173°, indicates the position of Dispatch or Roman rock.

Dangers.—The reef off Cape Recife is fringed with a bank on which the depths are less than 5 fathoms (9^{m}1), and which extends as much as a mile south-south-westward of the cape. Near the edge of this

Charts 2095, 596, 2202a, 748a, 2203, 2483.

Chart 641.

bank, about 9 cables south-south-westward of Cape Recife lighthouse, is Thunderbolt reef, a patch which dries, and on which there are a few small detached rocks; the sea generally breaks on this reef, but not always at high water and in fine weather.

A pinnacle rock with a depth of less than 6 feet ($1^{m}8$) over it, lies near the edge of the 5-fathom bank, about three-quarters of a mile south-eastward of Cape Recife lighthouse, and another rock, with a depth of 44 feet ($13^{m}4$) over it, lies about 1¼ miles south-eastward of the lighthouse.

Caution.—Vessels should not attempt to approach either Cape Recife or Thunderbolt reef within a distance of 2 miles, on account of an indraught towards them.

As the depths near the cape and reef decrease suddenly from 10 fathoms ($18^{m}3$), vessels approaching Port Elizabeth should keep in depths of more than 40 fathoms ($73^{m}1$), and not approach within about 2½ miles of the coast, until eastward of Cape Recife lighthouse.

Chart 2085.

Dumping ground.—A dumping ground for explosives is indicated on the chart in a position about 14 miles southward of Cape Recife (*Lat. 34° 02′ S., Long. 25° 43′ E.*).

Chart 641.

Out-lying danger.—Riy bank, a rocky bank, with depths of from 6 to 14 fathoms ($11^{m}0$ to $25^{m}6$) over it, and over which the sea breaks heavily during and after gales, lies about 8½ miles east-north-eastward of Cape Recife. A *red* sector of Port Elizabeth light, between the bearings of 274° and 308°, covers this bank.

Charts 2084, 2085.

General directions between Knysna harbour and Cape Recife.—Between Cape Seal and Tsitsikama point, the coast should not be approached within 2 or 3 miles by day, and by night or in thick weather, vessels should keep in depths of more than 45 fathoms ($82^{m}3$). Between Tsitsikama point and Cape St. Francis, the same distance from the coast should be observed by day; at night, or in thick weather, vessels should keep in depths of more than 70 fathoms ($128^{m}0$), owing to the irregularity of the soundings, and to the possibility of the current setting directly towards the coast.

Between Capes St. Francis and Recife the same offing should be preserved by day; at night, or in thick weather, vessels should keep in depths of more than 45 fathoms ($82^{m}3$) until reaching the vicinity of Glasson point, and in depths of more than 60 fathoms ($109^{m}7$) when in the vicinity of Cape Recife.

Current.—On this part of the coast a current sometimes sets either directly towards the shore or north-eastward, and, as dense fogs are not uncommon, vessels should avoid hugging the land by night or in thick weather. From Cape Agulhas eastward as far as the mouth of Buffalo river, the current normally setting westward along the coast has been known to set towards that river, especially opposite bays and after south-easterly gales. *See* currents, page 22.

Charts 641, 2085.

ALGOA BAY.—**Coast.**—This large bay is entered between Cape Recife and Woody cape, about 33 miles east-north-eastward. It is subject to the full force of the south-easterly gales which blow violently

Charts 2095, 596, 748a, 2203, 2483.

Charts 641, 2085.

at times between October and April, but, in the south-western corner of the bay, safe and convenient anchorage may generally be obtained off Port Elizabeth. Easterly and south-easterly gales are the only dangerous winds in Algoa bay; during the strength of these gales, a heavy and dangerous breaking sea rolls in, but vessels with plenty of cable out generally ride easily, and, from the strong easterly set which prevails near the coast, it is probable that a powerful undertow assists to relieve the strain.

From Cape Recife to Beacon point, about 3 miles north-north-westward, and thence 3 miles north-westward to Port Elizabeth harbour, the coast is fringed with rocks, and shoal patches over which there are depths of less than 5 fathoms ($9^{m}1$), extend in places as much as 9 cables offshore.

The port of Port Elizabeth comprises an outer anchorage and a harbour enclosed by a breakwater, in the shelter of which, vessels with a draught of 36 feet ($11^{m}0$) can be accommodated. A conspicuous tower, 169 feet ($51^{m}5$) in height, stands close to the root of the North arm of the harbour.

From Port Elizabeth harbour, the coast trends northward for about 5 miles to the mouth of Zwartkops river; the surf is usually heavy on the bar across its entrance, over which there is a depth of a few feet, but within its entrance, the river is navigable for small vessels for 8 or 9 miles.

Chart 2085.

About 5 miles north-eastward of Zwartkops river mouth is the entrance to Coega river (*Lat. 33° 48′ S., Long. 25° 42′ E.*) which is small and almost closed by a bar.

Sundays river enters the bay about 9½ miles east-north-eastward of the mouth of Coega river; there is generally too much surf on its bar to allow the passage of boats. A remarkable rock, named Read's monument, lies close within the entrance.

Landmankop, 436 feet ($132^{m}9$) in height, with a smooth rounded summit, lies 13 cables northward of Sundays River mouth and helps to identify it from seaward.

With the exception of the sandhills at Woody cape, which are covered with dark bushes, the coast, from the mouth of Sundays river for about 21 miles eastward to Woody cape, consists of a succession of bare sandhills, rising to elevations of from 350 to 450 feet ($106^{m}7$ to $137^{m}2$), and extending about 1½ miles inland; northward of these sandhills, there is a coastal range of bush covered sandhills, the highest of which are 544 and 520 feet ($165^{m}8$ and $158^{m}5$) in height, 5 miles east-north-eastward and 13¼ miles eastward, respectively, of Sundays River mouth (*Lat. 33° 43′ S., Long. 25° 51′ E.*). Within the coastal range, the land rises to forest-covered summits of about 1,000 to 1,200 feet ($304^{m}8$ to $365^{m}8$) in height. None of these are sharply defined with the possible exceptions of Boschhoek hill, 1,106 feet ($337^{m}1$) in height and Bailey's Kop (Langebosch Kop), 1,184 feet ($360^{m}9$) in height, which can most easily be identified from the southward and south-eastward, the former having a twin peak, 945 feet ($288^{m}0$) in height, one mile south-eastward from it.

Chart 641.

Off-lying dangers.—Beacons.—Light-and-bell-buoy.—Dispatch or Roman rock, over which there is a least depth of 14 feet

Chart 641.

(4^{m}3), lies about one mile eastward of Beacon point. It is steep-to on its south-eastern side, but depths of less than 5 fathoms (9^{m}1) extend as much as 2 cables north-westward of it, and 16-foot (4^{m}9) patches lie one cable and 2¼ cables westward of the rock.

Two stone beacons, each 25 feet (7^{m}6) in height, surmounted by a ball and painted in red and white bands, are situated about half a mile southward of Beacon point ; they are about 6 cables apart, and when in line, bearing 237°, indicate the position of Dispatch rock. The red roof of the golf clubhouse, situated about 6 cables southward of the front beacon, is conspicuous when approaching from the south-eastward.

A cylindrical light-and-bell-buoy, painted in black and red vertical stripes, exhibiting a *group flashing red* light having *two* flashes *every 10 seconds*, is moored off the north-eastern side of Dispatch rock (*Lat. 33° 59′ S., Long. 25° 42′ E.*), about 1¼ miles north-eastward of the front beacon.

A shoal over which there is a least depth of 25 feet (7^{m}6) lies about three-quarters of a mile north-eastward of Beacon point.

Dispatch rock and the adjacent shoals are covered by a *red* sector of Cape Recife light between the bearings of 162° and 190°, and by a *red* sector of Port Elizabeth light between the bearings of 274° and 308°.

Chart 2085.

Off-lying islands.—Shoal.—Anchorage.—Three small islands, all fairly steep-to, are situated eastward of the entrance to Coega river ; Jahleel island, 47 feet (14^{m}3) high, is the closest inshore, and is about 7 cables south-eastward of the river mouth. Brenton rock, 50 feet (15^{m}2) high, is about 3 miles east-south-eastward of Jahleel island, and St. Croix island is just over a mile northward of Brenton rock ; the latter island consists of almost bare rock, and its western peak is 195 feet (59^{m}4) high.

A shoal, with a depth of 52 feet (15^{m}8) over it, lies about 3¼ miles south-eastward of the south-eastern extremity of St. Croix island.

Moderate shelter may be obtained about 3 cables north-westward of the northern extreme of St. Croix island, in a depth of 10 fathoms (18^{m}3), sand, with the western peak on the island bearing 140°, but the extent of anchorage sheltered from the heavy sea caused by south-easterly gales, is confined to a very small space owing to the shape of the island.

Chart 641.

Lights.—A light is exhibited, at an elevation of 255 feet (77^{m}7), from a white octagonal tower, 86 feet (26^{m}2) in height, situated on a hill within the town of Port Elizabeth, and about 1¼ miles west-south-westward of the head of the breakwater.

A light for the use of aircraft is occasionally exhibited, at an elevation of 251 feet (76^{m}5), from a position about 1¾ miles south-south-westward of Port Elizabeth lighthouse (*Lat. 33° 58′ S., Long. 25° 37′ E.*).

A light for the use of aircraft, is exhibited at an elevation of 209 feet (63^{m}7), from each of the two radio masts, about 1½ miles south-south-eastward of the lighthouse.

Two *red* obstruction lights, disposed vertically at elevations of 238 and 161 feet (72^{m}5 and 49^{m}1), respectively, mark a radio mast, 135 feet (41^{m}2) in height, situated about 2¾ miles north-north-westward of the lighthouse.

Charts 2095, 596, 748a, 2203, 2483.

Chart 641.

A *red* obstruction light is exhibited, at an elevation of 691 feet (210^{m}6), from the top of a radio mast, painted in orange and black bands, situated about 3½ miles north-westward of the lighthouse ; two similar lights are exhibited half-way down the mast ; these three lights are only visible to shipping on dark nights with clear visibility.

A light is exhibited at Humewood, about 1¾ miles south-eastward of the lighthouse, at an elevation of 202 feet (61^{m}6), from a black framework beacon with a white diamond in its centre, 25 feet (7^{m}6) in height.

Tidal streams.—The tidal streams are very weak and the water flow depends mainly on the wind.

Chart 2085.

Bird islands.—Light.—Leading beacons.—This group consists of Bird, Seal and Stag islands and Black rocks. They are surrounded by four outlying dangers, namely North patch to the northward and West rock, Doddington rock and East reef to the southward.

Bird island, which is the largest, lies about 4½ miles south-south-westward of Woody cape. It is low and fringed by rocky ledges with a flat drying ledge extending 4 cables to the westward. The island appears a bright green except over the guano flats at the eastern end. On the north-eastern side of the island, there is a wooden loading pier and two concrete jetties with a concrete boat slipway between them. The western jetty is old and disused, but the eastern jetty provides a reasonable landing for boats if the swell is not too heavy. With easterly winds there is a safe boat landing at high water on the north-western extremity of the island.

A light is exhibited, at an elevation of 100 feet (30^{m}5), from a square stone tower, 85 feet (25^{m}9) in height, situated near the southern end of Bird island (*Lat. 33° 50′ S., Long. 26° 17′ E.*). A signal station is maintained on the island and the lighthouse is in R/T communication with the Port authorities at Port Elizabeth.

Two leading beacons situated on the north-eastern side of the island, in line bearing 241°, form the best line of approach to Stag bay anchorage about 5 cables north-eastward of the light. A boat approaching the landing jetty should keep these beacons in line to clear the breakers extending south-eastward of Stag island as far as the 3-fathom (5^{m}5) line.

Stag and Seal islands, lying about 2½ cables north-north-westward and 4 cables north-westward respectively from the northern end of Bird island, are joined by a reef which dries at low water.

Black rocks, consisting of five small islets, the largest of which is 20 feet (6^{m}1) high and covered with a white cap of guano, lie 6 cables west-south-westward of Seal island and are usually surrounded by heavy breakers. A chain of rocks and reefs extends from the south-western extremity of Seal island to within half a cable of Black rocks, leaving a boat passage in which there is a depth of 4 fathoms (7^{m}3). This passage should not be attempted without local knowledge. Passages for small boats at high water exist over the reefs both eastward and south-westward of Seal island. The south-western passage is dangerous owing to a treacherous backwash, but the eastern passage is fairly safe in practically any weather. The shallow lagoon formed by the islands is nearly always a calm anchorage for boats, even in southerly winds, as the surf breaks on the 3-fathom (5^{m}5) line between Bird island and Black rocks and thus a lee is provided.

Charts 2095, 596, 748a, 2203, 2483.

Chart 2085.

Large numbers of seals congregate on Black rocks during the breeding season. In 1950 no seals were seen on Stag or Seal islands, but on the latter there was a large rookery of penguins.

Dangers.—North patch, consisting of a few rocks, which dry 3 feet (0^{m}9), lies about 8 cables northward of Bird Island lighthouse (*Lat. 33° 50′ S., Long. 26° 17′ E.*). It is surrounded by a 3-fathom (5^{m}5) shoal, 2 cables wide at the rocks and extending 3 cables to the eastward and westward of the rocks. A channel, one cable wide and with a least depth of 19 feet (5^{m}8), lies between North patch and Stag island.

West rock, Doddington rock and East reef lie 15 cables west-south-westward, 12 cables south-south-westward and 13 cables southward of Bird Island lighthouse. The two former dry 3 feet (0^{m}9) and the latter has a depth of 17 feet (5^{m}2) over it, but has not been closely examined. The sea always breaks over West and Doddington rocks and nearly always over East reef.

South passage between these rocks and reef and the Bird islands appears to be free from dangers, but is not recommended as, except in the calmest weather, heavy breaking seas cover the whole area. In thick weather vessels passing to the southward of Bird islands (*Lat. 33° 50′ S., Long. 26° 17′ E.*) should keep in depths of more than 60 fathoms (109^{m}7).

Anchorages.—The anchorage in 4½ to 6 fathoms (8^{m}2 to 11^{m}0) on the leading line mentioned on page 134 is the best anchorage in Stag bay. The holding ground is good, but there is nearly always a swell sweeping round the reef on the eastern extremity of Bird island. H.M.S. *Geyser*, when anchored in depths of from 8 to 10 fathoms (14^{m}6 to 18^{m}3) with Black rocks bearing 254° and in line with Stag island, dragged to leeward in a heavy west-south-westerly gale with 75 fathoms (187^{m}3) of cable out.

On the northern side of the islands anchorage may be obtained in 14 to 15 fathoms (25^{m}6 to 27^{m}4), coarse sand, with Bird Island lighthouse bearing 124° distant 13 cables and in line with the south-western extremity of Seal island. The holding ground is not so good as that in Stag bay and vessels must be prepared to weigh at short notice should the wind freshen from the westward.

The anchorage affording the best holding ground in this vicinity is in 8 to 9 fathoms (14^{m}6 to 16^{m}5), with North patch bearing 180° distant 5 cables, and in line with Bird Island lighthouse, but a sudden shift of strong wind from easterly to westerly causes a very confused sea in the passage.

In 1950, H.M.S.A.S. *Protea* frequently used this anchorage and at no time did she drag her anchor.

Tidal streams.—Current.—The tidal streams in the vicinity are negligible and the water flow depends on the current. In the passage, the current generally sets weakly westward, though on occasions after westerly winds the counter current may set to the east. Within a distance of one mile southward of Woody cape, however, the counter current nearly always runs, sometimes strongly.

Bird Island passage.—Vessels bound eastward from Algoa bay in favourable weather are recommended to take the channel between Bird islands and the mainland, known as Bird Island passage, as, by so doing, they will avoid the strong current which, southward of

Charts 2095, 596, 748a, 2203, 2483.

Chart 2085.

the islands, is always setting south-westward. The passage is deep and clear of dangers, and vessels may proceed along the coast, preserving an offing of about 3 miles, as far as Buffalo river, the outermost dangers being some sunken rocks off Riet point (*Lat. 33° 34′ S., Long. 27° 01′ E.*), *see* page 144.

Vessels making use of the passage at night, are recommended to keep closer to the mainland than the islands, as the former is higher and more readily discerned, and the constant roar of the surf more distinctly heard than the breakers on the reefs off the islets. Constant sounding should indicate too close an approach to the mainland, and vessels should generally keep in depths of more than 10 fathoms (18^{m}3), except off Woody cape, where depths of not less than 51 feet (15^{m}5) may be encountered as much as 1½ miles from the cape. As foul ground extends for about three-quarters of a mile southward of Cape Padrone, *see* page 141, a berth of 1½ miles should be given to that cape.

Vessels passing southward of Bird islands should not approach within 3 miles of the lighthouse, as no advantage is gained by a closer approach, and the current in the vicinity of the islands, though generally weak, is uncertain and irregular, both in strength and direction.

Vessels bound from Algoa bay to Durban generally follow the coast.

Charts 641, 2085.

General directions.—By day, vessels from westward, after rounding Cape Recife at a distance of about 3 miles, or in depths of not less than 40 fathoms (73^{m}2) when westward of the cape, should steer about 346°, keeping the lighthouse on it bearing more than 190°, and well open eastward of the beacon, painted in black and white bands, northward of it, until northward of the line of the two beacons marking the position of Dispatch rock; from this position, which is northward of Dispatch rock, course may be shaped for the anchorage as convenient.

A strong indraught is often experienced after passing Thunderbolt reef and Cape Recife, and allowance should be made for it in passing Dispatch rock; all vessels entering or leaving Algoa bay should keep eastward of the light-and-bell-buoy marking the position of this rock.

At night, Cape Recife may be rounded at a distance of about 3½ miles or in a depth of not less than 50 fathoms (91^{m}4) when westward of the cape, allowing for a possible indraught towards Thunderbolt reef and the cape; if the cape is passed at this distance, vessels will enter the *red* sector of Port Elizabeth light when Cape Recife light bears about 295°.

When Cape Recife light bears about 290°, course may be altered to 346° and vessels should be kept in the *white* sector of Cape Recife light, and should not enter its *red* sector until Port Elizabeth light has changed from *red* to *white*, on which, being then northward of Dispatch rock, they may shape course for the anchorage as convenient, being guided by Port Elizabeth and the harbour lights.

Vessels from eastward should keep in the *white* sector of Port Elizabeth light, and should not cross its southern limit into the *red* sector which covers Riy bank as well as Dispatch rock (*Lat. 33° 59′ S., Long. 25° 42′ E.*).

Vessels leaving Algoa bay and proceeding eastward, are recommended to take the passage northward of Bird island, *see* page 135, in fine weather.

Charts 2095, 596, 748a, 2203, 2483.

Charts 641, 2085.

Port Elizabeth.—Pilotage.—Port limits.—Port regulations.— Pilotage is compulsory for merchant vessels in the harbour and in the approaches thereto.

The limits of the port under the Harbour authorities are as follows: The area included within a line drawn from Cape Recife to a point at sea bearing 090°, one mile; from that point to another point bearing from it 340°, 10·5 miles; and from the last named position to the northern entrance point of Zwartkops river, bearing 270°, one mile.

The Regulations for the Harbours of the Union of South Africa are in force at Port Elizabeth.

Chart 641, plan of Port Elizabeth.

Harbour.—Lights.—Fog signal.—Depths.—Buoy.— The harbour is protected on its eastern and south-eastern side by South breakwater, which extends for nearly a mile north-north-eastward from Dom Pedro jetty in the southern corner, and on the north by North arm, which extends from the shore for about three-quarters of a mile in an easterly direction. The entrance, between the heads of South breakwater and North arm, is about 420 yards ($384^{m}0$) wide.

A light is exhibited, at an elevation of 32 feet ($9^{m}8$) from a structure at the head of South breakwater. A fog signal is sounded from the light-structure.

A light is exhibited, at an elevation of 22 feet ($6^{m}7$), from a structure at the head of North arm.

The harbour entrance, and that part of the harbour eastward of No. 2 quay and northward of a line prolonging No. 2 quay to South breakwater, is dredged to a depth of 36 feet ($11^{m}0$); in 1952, however, there were depths of 34 feet ($10^{m}4$) about 3½ cables south-westward and 2¾ cables southward of South breakwater light.

Southward of this line, the depths gradually decrease to about 20 feet ($6^{m}1$) abreast the head of Dom Pedro jetty, whence they shoal gradually to the shore. Strutts reef, over which there is a depth of 15 feet ($4^{m}6$), lies about one cable north-westward of the head of Dom Pedro jetty.

A black can buoy is moored close southward of Strutts reef.

About half a cable north-westward of Strutts reef there is a depth of 17 feet ($5^{m}2$).

The holding ground in the dredged part of the harbour is poor on account of the rocky nature of the bottom.

In 1952 the quayage was as follows:—

North jetty projects from the shore at the north-western corner of the harbour east-north-eastward to the root of Charl Malan quay (*Lat. 33° 58′ S., Long. 25° 38′ E.*). It is 720 feet ($219^{m}5$) in length, with depths alongside of from 11 feet ($3^{m}4$) at its inshore end to 25 feet ($7^{m}6$) at its seaward end. It is normally only used for berthing tugs and small harbour craft.

Charl Malan quay projects eastward from North jetty and is the southern side of North arm. It is 3,540 feet ($1{,}079^{m}0$) in length, with depths alongside of generally more than 36 feet ($11^{m}0$), except at the extreme inshore end where, in 1952, there was a depth of 28 feet ($8^{m}5$).

Berths Nos. 1–7 are situated at this quay and are numbered from westward to eastward.

No. 2 quay projects from the shore, southward of and parallel to

Charts 2095, 596, 748a, 2203, 2483.

Chart 641, plan of Port Elizabeth.

Charl Malan quay. It is 1,700 feet ($518^{m}2$) in length, with a depth alongside its northern side of more than 36 feet ($11^{m}0$). The berths alongside this side are numbered 8 and 9. There is, at present, no berthing accommodation alongside the southern side, but constructional work is in progress.

Dom Pedro jetty projects north-eastward from the southern corner of the harbour and forms the root of South breakwater. It is 860 feet ($262^{m}1$) in length, with depths alongside of from 10 feet ($3^{m}0$) at its inshore end to 18 feet ($5^{m}5$) at its seaward end. This is the normal berth for trawlers and fishing craft.

There is a tanker berth, with a least depth of 35 feet ($10^{m}7$) about half-way along the South breakwater on the western side, which can accommodate a vessel up to 600 feet ($182^{m}9$) in length.

The outer faces of the slipway between No. 2 quay and Dom Pedro jetty constitute South jetty, with depths from 15 to 22 feet ($4^{m}6$ to $6^{m}7$), where dredgers and small craft usually berth.

Traffic signals.—The Port signal station is situated in a tower above the Port offices near the head of Charl Malan quay. A mast, 70 feet ($21^{m}3$) in height, stands alongside the signal station.

During the hours of darkness, the following traffic signals are exhibited from this mast :—

2 *red* lights, disposed vertically, indicating the necessity of keeping clear of an out-going vessel.

2 *green* lights, disposed vertically, indicating the necessity of keeping clear of an in-coming vessel.

Port facilities.—All the quays and jetties are connected to the general railway system, and Charl Malan and No. 2 quays are equipped with cranes of 4 and 15 tons lifting capacity.

Supplies.—A moderate quantity of South African coal is stocked. It is put on board alongside Charl Malan quay by cranes at the rate of about 30 tons per hour.

Fuel oil may be obtained at any berth at Charl Malan and No. 2 quays.

Fresh provisions are plentiful at all seasons.

Water is laid on to the quays and can also be supplied to ships at anchor by tug.

Tugs.—There are two large tugs, fitted with salvage and fire appliances and equipped with radio.

Repairs.—Large repairs to hull, engines and boilers can be executed.

There is an electrically operated patent slip, capable of taking ships up to 1,200 tons, *see* Appendix II. There is also a small 40-ton slipway for boats and fishing craft adjacent to the main slipway.

Life-saving.—A line-throwing apparatus is kept at Port Elizabeth (*Lat. 33° 57′ S., Long. 25° 37′ E.*).

Town.—Port Elizabeth is, after Cape Town, the largest seaport of Cape Province, and its geographical position, nearly midway between Cape Town and Durban, gives it considerable importance. Baakens river, which passes through the town, is no longer navigable and is overgrown with weed.

There is a hospital and a seaman's institute in the town.

In 1951, the population consisted of 215,416 of all races, of whom 83,181 were Europeans.

In the year 1951, a total of 773 vessels, other than fishing vessels,

Charts 2085, 2095, 748a, 2203, 2483.

Chart 641, plan of Port Elizabeth.

with an aggregate tonnage of 6,764,000 tons, visited the port, to which may be added 105 coasters.

Communications.—There is regular communication by sea with other South African ports and with Europe.

There is a regular air service with Cape Town, Johannesburg and Durban.

There is a radio station at Port Elizabeth (*Lat. 33° 59′ S., Long. 25° 38′ E.*), *see* page 35.

Climatic table, *see* page 67.

Charts 2085, 2095, 596, 748a, 2203, 2483.

CHAPTER IV

WOODY CAPE TO WATERFALL BLUFF

Chart 2095.

GENERAL REMARKS.—Between Cape Padrone (*Lat. 33° 46′ S., Long. 26° 28′ E.*) and Waterfall bluff, the offshore depths on the Agulhas bank are moderately regular and the edge of the bank is generally steep, the depths in places increasing over 100 fathoms ($182^{m}9$) in less than a mile. During westerly or south-westerly gales, the edge of the bank is usually well defined by the comparative smoothness of the sea over the bank, and there is considerably less sea within 3 miles of the coast than farther out, in the full strength of the Agulhas current. Should a south-westerly gale be anticipated, south-bound vessels are recommended to keep within 3 or 4 miles of the coast, as the calmer sea encountered will more than compensate for the more favourable current which would be experienced farther seaward. Deeply laden vessels, keeping far seaward, may be seriously damaged in south-westerly gales in this locality.

Between Cape Padrone and Bashee point, the coast should not be approached within a distance of 2 miles, and at night or in thick weather, vessels should keep in depths of more than 40 fathoms ($73^{m}2$).

Between Bashee point and Waterfall bluff, vessels may with advantage keep closer to the land, and by day north-bound vessels may shape a course to pass not less than three-quarters of a mile off each point on this part of the coast, but vessels should not attempt to hug the land when crossing the bays, as most of them are foul. South-bound vessels, keeping inshore on account of south-westerly gales as recommended above, may pass as close as one mile off projecting points. At night, whether north or south-bound, vessels should keep in depths of more than 40 fathoms ($73^{m}2$).

Currents.—Off the coast between Cape Padrone and Waterfall bluff, the Agulhas current generally sets south-westward parallel with the coast, and varies in strength from about one knot near the coast to 3½ or 4 knots near the edge of the bank. In calm weather, the current has been observed running like a race or overfall near the edge of the bank south-eastward of Cape Padrone. An occasional weak countercurrent setting north-eastward may be found near the coast, and this north-easterly set has occasionally been known to extend for 7 or 8 miles offshore ; observation of the discoloured water from the various rivers will assist in ascertaining if this countercurrent is present. Close inshore, an eddy current may often be found setting north-eastward near the edge of the breakers, but its rate seldom exceeds half a knot. It has also been reported that, in the vicinity of Buffalo

Charts 596, 748a, 2203, 2483.

Chart 2095.

river, a current setting towards the coast is often experienced after southerly or south-easterly gales.

Charts 2085, 3769.

WOODY CAPE TO HOOD POINT.—Aspect.—Between Woody Cape and the mouth of Kowie river, about 33 miles east-north-eastward, the coastal ridge is partially faced with sand, which within 5 miles of Kowie river, rises to an elevation of 250 feet ($76^{m}2$) from its base. Within the coast, the land presents an appearance of good pasture country, with large patches under cultivation, and is traversed by several rivers flowing through ravines. Viewed from seaward, in the vicinity of Cape Padrone, the most remarkable features are Nanquas peak, 983 feet ($299^{m}6$) high, about 3¼ miles north-eastward of the cape, and westward, the high sandhills close to Woody cape. Nanquas peak, the most conspicuous mark in the vicinity, appears flat-topped when seen from southward, but assumes a conical shape when seen from south-eastward. *See* views facing page 148 and view on chart 2085.

Between the mouth of Kowie river and Keiskama point, about 35 miles north-eastward, the coastal ridge continues to be faced with sand rising from its base in places to elevations of over 300 feet ($91^{m}4$). The land within the coast continues to present a fine tract of pasture country, with large patches under cultivation, and is crossed by numerous rivers, mostly small. In fine weather, the range of mountains near Grahamstown and the Amatola range, about 30 miles inland from Keiskama point, may be seen. *See* view on chart 2085.

Between Keiskama point and Hood point, about 26 miles north-eastward, the coastal ridge is irregular and is covered with grass and patches of bush, and faced with sand at intervals. The land within the coast is covered with dark bush and rises to an elevation of from 600 to 700 feet ($182^{m}9$ to $213^{m}4$) at about 6 miles inland In clear weather, the mountain range near Grahamstown and the Amatola range near Kingwilliamstown, may be seen when well off the coast.

Chart 2085.

Coast.—The dark bush-covered sandhills, over 100 feet ($30^{m}5$) high, which are a feature of Woody cape, *see* page 132, end at the southernmost extremity of the cape. High sandstone cliffs extend about 3 miles westward and about one mile eastward of this extremity. Within the cliffs eastward of Woody cape (*Lat. 33° 46′ S., Long. 26° 19′ E.*) and for 5 miles further eastward, bare sandhills extend to a ridge covered with bush, and further inland are hills covered with dense forest, which are cleared in patches for cultivation.

About 6 miles eastward of Woody cape, another sandstone cliff, 30 to 50 feet ($9^{m}1$ to $15^{m}2$) high, is found, the eastern extremity of which forms Cape Padrone. Within the cliff, sandhills extend for about a mile inland to a grassy ridge about 500 feet high.

Fresh water springs are to be found at the base of the cliffs, both at Woody cape and Cape Padrone. The springs at Woody cape are covered at high water, but those at Cape Padrone are above the high water mark. Landing is impracticable in the vicinity of any of these springs.

From Cape Padrone (*Lat. 33° 46′ S., Long. 26° 28′ E.*) to the mouth of Boknes river about 7 miles east-north-eastward, the coast is fringed

Charts 596, 748a, 2203, 2483.

Chart 2085.

with rocks both sunken and awash; foul rocky ground, extending about 5 cables to seaward from the coast, exists for approximately 2 miles eastward of the cape, through there appears to be a clear lead, about 3 cables wide, in the middle of this area, where a boat might land in very calm weather. Cannon rocks, about 4 miles east-north-eastward of the cape, consist of a ledge of rocks about 12 feet ($3^{m}7$) high. There is rocky foul ground for a further 1½ miles east-north-eastward extending about 4 cables seaward, and a rocky ledge, under 6 fathoms ($11^{m}0$) in depth, extends 2½ miles eastward of Cannon rocks. In bad weather heavy breaking seas occur off the 10-fathom ($18^{m}3$) line close to this ledge and also off Cape Padrone at distances from the shore of 2 and 1½ miles respectively. The mouth of Boknes river is closed, but it can easily be identified by a water tower and a cluster of holiday bungalows on its western bank.

Boknes hill, about 2 miles north-westward of the mouth of Boknes river, is 673 feet ($205^{m}1$) high, flat-topped and covered with bush.

From the mouth of Boknes river, a sandy beach extends for 2 miles east-north-eastward to False islet; the beach is backed by a bushy ridge, about 100 feet ($30^{m}5$) high, which is partially faced with sand.

False islet or Kwaai hoek (*Lat. 33° 48′ S., Long. 26° 38′ E.*) is a dark headland 95 feet ($29^{m}0$) high, close eastward of which are several above-water rocks. When viewed from seaward, it shows up against the white sand and resembles an islet; its seaward face is precipitous, and it is connected to the mainland by sandy hillocks.

At its summit, a replica of a stone cross reconstructed from the fragments found among the rocks below, has been erected. It is 15 feet ($46^{m}6$) in height. The original was thought to have been erected hereabouts by Bartholomew Diaz in the latter part of the 15th century. In calm weather landing can be effected in a small boat between two rocky ledges close north-eastward of False islet.

About 9 cables north-eastward of False islet, there is a bush-covered sandhill whose base is also fringed with rocks. In certain lights this has a similar appearance to False islet.

Coast.—Between False islet and the mouth of Bushmans river, about 2½ miles east-north-eastward, the coast is fringed with sunken and awash rocks which extend as much as 4 cables offshore. The mouth of Bushmans river is nearly always open; its southern entrance point is a dark high cliff on which are three mounds, and the dark rock stands out conspicuously against a neck of sand which connects the cliff to the main coastal ridge.

From the mouth of Bushmans river for about 1½ miles east-north-eastward to the mouth of Kariega river, and thence 3 miles east-north-eastward to the mouth of Kasouga river, the coast is fringed with groups of rocks, some of which are above water; the outermost of these lies about 9 cables south-eastward of the mouth of Kariega river. There are two conspicuous pine trees standing about 7 cables inland between the mouth of Bushmans river and that of Kariega river (*Lat. 33° 41′ S., Long. 26° 41′ E*). These trees, the top of the higher of which was 301 feet ($91^{m}7$) in 1949, stand in the grounds of a holiday hotel at the growing seaside resort of Kenton-on-Sea. The lights of this hotel can generally be seen at a distance of 5 or 6 miles at night.

Between the mouths of Bushmans and Kasouga rivers, the coastal

Charts 2095, 596, 748a, 2203, 2483.

Chart 2085.

ridge rises gradually from 180 to 225 feet ($54^{m}9$ to $68^{m}6$), and is covered with bush and partially faced with sand. The entrances to both Kariega and Kasouga rivers are noticeable, the former being generally open at high water.

Coast.—Anchorage.—Beacon.—East-north-eastward of Kasouga river, the coastal ridge rises above 400 feet ($121^{m}9$), and is faced with sand to seaward. Ship rock about 1¼ miles east-north-eastward of the river is 22 feet ($6^{m}7$) high. It is an outcrop from a 50-foot ($15^{m}2$) cliff just inshore of it and is surrounded by water at high water. It cannot normally be distinguished from the cliff itself at distances of more than 3 miles. There is a good anchorage, sand and coral, in 15 fathoms ($27^{m}4$) 1¾ miles southward of Ship rock. Another outcrop of rock, 28 feet ($8^{m}5$) in height, two miles further east-north-eastward, is known as the " Wreck " and is situated on the high water line. It stands out prominently against the sand.

Between the " Wreck " and Kowie point a low projection about 3¾ miles east-north-eastward, the coast is sandy for about 2 miles and then fringed with rocks. Within the coastal ridge, about 2 miles west-north-westward of Kowie point, is Glendower peak, a grassy hill 634 feet ($193^{m}2$) in height (*Lat. 33° 37′ S., Long. 26° 49′ E.*) moderately steep on both sides. *See* view facing page 148, and view on chart 2085.

A pyramidal stone beacon, 50 feet ($15^{m}2$) in height, the upper part being black and the lower part white, stands on Glendower peak.

From Kowie point to Salt Vlei point, about 1½ miles north-eastward, and thence one mile north-eastward to the mouth of the Kowie river, the coastal ridge declines in height and is covered with grass. Salt Vlei point is low and rocky; a shoal on which the depths are less than 3 fathoms ($5^{m}5$), extends about 5 cables eastward of it.

Salt Vlei bay is entered close westward of Salt Vlei point; its entrance points are fringed with rocks, Peak and Black rocks being nearly one cable offshore near the western entrance point. At the head of the bay is a sandy beach, within which the low and grassy land rises to a bushy ridge of hills, from 60 to 140 feet ($18^{m}3$ to $42^{m}7$) high, which extends north-eastward to the bank of Kowie river.

Kowie river.—Entrance.—This river, rising near Grahamstown about 40 miles from its mouth, is navigable for about one mile as far as the bridge by small vessels and for upward of 16 miles by boats.

From westward, the position of Kowie river may be identified by Glendower peak and the beacon on it, the adjacent country consisting of smooth grassy slopes dotted with bush, and fronted by a ridge of sandy hillocks; from eastward, Black rocks, or Three Sisters, 7 miles east-north-eastward of the river entrance, *see* page 145, are a guide, and the buildings of the village will indicate the entrance. A house resembling a castle on the western bank, which has a flagstaff in its grounds, the village on the cultivated slope of the eastern bank, and the high head over Riet point, *see* page 144, will all serve to identify this part of the coast. The mountains at Bathurst, 7 miles north-north-eastward of the entrance, and the range in the vicinity of Grahamstown, are also conspicuous. *See* view on chart 2085.

Port Alfred, situated close within the entrance to Kowie river, was once a port; the harbour works, which consisted of two training walls or piers, extending seaward from each entrance point, have

Charts 2095, 596, 748a, 2203, 2483.

Chart 2085.

fallen into decay. Within the entrance, the river has stone embankments on either side for a distance of 1½ miles that on the eastern bank being 7 feet (2^{m}1) high.

There is a bar at the entrance, its outer edge being about one cable south-eastward of the western pier head. The heavy swells caused by westerly or south-westerly winds decrease the depths on the bar, and the channel is subject to considerable changes in both depth and direction. In 1951, the bar had about one foot (0^{m}3) over it and could only be crossed by small craft with local knowledge.

Dangers.—A shoal, over which there is a depth of 22 feet (6^{m}7) and which sometimes breaks, lies about 2½ cables south-eastward of the western pier head (*Lat. 33° 36′ S., Long. 26° 54′ E.*). This was not closely examined by H.M.S.A.S. *Protea* in 1951 because of the surf in the vicinity, but it would appear that considerable silting has occurred close to the breakwater heads.

Fountain rocks, a group of sunken rocks, some of which dry, lie about 1½ miles eastward of the entrance and 6 cables offshore ; the sea always breaks over the outer patches, which are steep-to.

Jansen's rock, a rock awash, lies about 3 cables eastward of Fountain rocks and is steep-to.

Anchorage.—The anchorage recommended is in 16 fathoms (29^{m}3) with the river open and the western pier head bearing 305° distant 14 cables. Anchorage in less water is not recommended owing to the poor holding ground. In bad weather a short breaking sea occurs inside distances of about one mile from the breakwaters. Vessels at anchor should immediately put to sea on the approach of bad weather.

In case of quitting the anchorage in bad weather, it should be remembered that between 5 and 50 miles offshore, the Agulhas current sets south-westward, often at the rate of 80 or 90 miles a day, and that moderate shelter may be found under the lee of Bird islands in Algoa bay (page 135). Also that by keeping within about 12 miles of the coast, the very heavy sea caused by the Agulhas current at a greater distance offshore, will be avoided.

Tidal stream.—The tidal stream is inappreciable at the anchorage.

Port Alfred.—Port Alfred is situated on both banks of the river entrance ; it is a popular seaside resort and has a genial climate.

In 1951 there was a population of 5,723.

Fresh provisions may be obtained.

Coast.—Dangers.—From the mouth of Kowie river, a sandy beach, fringed in places with rocks, extends for about 6 miles east-north-eastward to Riet point ; Rufane river is small and its mouth is closed and it flows through the beach 2 miles eastward of the mouth of Kowie river. About half a mile within the beach, the coastal ridge attains an elevation of from 230 to 350 feet (70^{m}1 to 106^{m}7), and is faced with sand in places ; Groenfontein hill, 500 feet (152^{m}4) high, and prominent when seen from either south-westward or north-eastward, stands within the coastal ridge about one mile westward of Riet point (*Lat. 33° 34′ S., Long. 27° 01′ E.*).

Chart 3769.

Riet point is low and sandy ; sunken rocks, on which the sea usually breaks heavily, extend about 8 cables off the point. Riet river, a small stream the mouth of which is usually closed, flows into the bight eastward of the point.

Charts 2095, 596, 748a, 2203, 2483.

Chart 3769.

Vessels should give Riet point a berth of at least 2 miles ; the outermost of the sunken rocks do not always break, and there are depths of over 10 fathoms ($18^{m}3$) close seaward of them. Great Fish Point lighthouse, described below, bearing 040°, leads about 2 miles off the point.

Between Riet point and the mouths of Kleinmond rivers, about 2½ miles east-north-eastward, the coastal ridge and the land within it decrease in height, the latter being grassy with patches of bush ; about midway between these points are Black rocks, or Three Sisters, three dark rocks which stand out conspicuously against the white sand behind them, and resemble islands. The central rock is 50 feet ($15^{m}2$) high, and they are precipitous to seaward and are connected by narrow necks to the mainland.

The coast from Black rocks for nearly three-quarters of a mile eastward, is fringed with sunken rocks extending about 4 cables offshore, and the sea breaks for some distance outside these dangers.

Between the mouths of Kleinmond rivers, which are generally closed, and Great Fish point, about 3½ miles east-north-eastward, the coastal ridge is faced with sand which extends nearly to its bush-covered summit, and rises gradually in elevation to Palmiet hill, a bare sandhill, 360 feet ($109^{m}7$) high, situated about 2 miles west-north-westward of Great Fish point ; this hill may be identified at 10 or 12 miles offshore.

A rock, which usually breaks, with a depth of less than 6 feet ($1^{m}8$) over it, lies about one mile eastward of Kleinmond rivers and about half a mile offshore ; from a point about 2 miles eastward of Kleinmond rivers sunken rocks extend about 3 cables offshore.

Great Fish point.—Light.—Great Fish point (*Lat. 33° 31′ S., Long. 27° 07′ E.*) is low, sandy and fringed with rocks, of which the outermost, which is awash at low water and is steep-to, lies about a quarter of a mile southward of the point ; the coastal hills rise to an elevation of 264 feet ($80^{m}5$), close within the point.

A light is exhibited, at an elevation of 278 feet ($84^{m}7$), from an octagonal tower, 30 feet ($9^{m}1$) in height, painted with black and white bands, situated on a prominent hill, half a mile north-westward of Great Fish point. The lighthouse is connected to Port Alfred by telephone.

Coast.—Between Great Fish point and the mouth of Great Fish river, about 2½ miles north-eastward, the coast and the land close within it are comparatively low, the latter being a grassy plain intersected with ravines. Little Fish point, about half a mile north-eastward of Great Fish point, is rocky and shelving, and has close within it a bushy hill, 142 feet ($43^{m}3$) high, partially faced with sand ; about 9 cables north-eastward of Great Fish point and about 2½ cables offshore, is a rock which dries 5 feet ($1^{m}5$) and on which the sea always breaks.

The mouth of Great Fish river is always open, but the sea generally breaks across the entrance, the depth in which is not known and probably varies, so that entering it at any time must be attended with considerable danger.

When viewed from seaward, a perceptible gap in the coastline is made by the ravine through which the river flows, and in clear weather, its position may be identified by distant mountains of an undulating

Charts 2085, 2095, 596, 748a, 2203, 2483.

form being seen in line with the gap when bearing about 310°. *See* view on chart 2085.

Rocky point, the eastern entrance point of Great Fish river, has three dark rocks, 25 feet ($7^{m}6$) high, lying close off it, and is fringed with smaller rocks and foul ground which extends for 1½ cables offshore; the sea breaks for some distance outside these dangers.

Current.—Being of a reddish colour, the waters of Great Fish river may, after rain, be traced for some miles westward of Kowie point, but are seldom seen eastward of the river's mouth; from this it would appear that near this part of the coast, the east-going countercurrent inshore is not of frequent occurrence, although it may be occasionally experienced.

Coast.—Waterloo bay is entered between the mouth of Great Fish river and Stalwart point (*Lat. 33° 28′ S., Long. 27° 13′ E.*), about 4 miles east-north-eastward; the coastal ridge within the bay rises steeply to from 180 to 250 feet ($54^{m}9$ to $76^{m}2$) high, and is faced with sand which extends nearly to its dark and bushy summit. Near the head of the bay, the coast is fringed with rocks which extend a few cables offshore. A dangerous rock, with a depth of 9 feet ($2^{m}7$) over it, lies about 11 cables east-north-eastward of Rocky point and about 5 cables offshore; in fine weather the sea seldom breaks on this rock.

Two peaked grassy hills, 545 and 582 feet ($166^{m}1$ and $177^{m}4$) high, visible from all directions, the higher of which is called Maitland hill, lie between 2 and 3 miles inland and are good marks for identifying the locality, as also is a dark hill close within Stalwart point.

Anchorage.—Waterloo bay cannot be recommended as an anchorage but, if it is necessary to communicate with the shore, vessels should anchor in depths of not less than 9 fathoms ($16^{m}5$). During the survey in 1938, anchorage was obtained in depths of 9 fathoms ($16^{m}5$), fine sand, with Great Fish Point lighthouse bearing 242° and Maitland hill bearing 350°; although exposed to the prevailing swell, the holding ground was good. Safer anchorage may be obtained farther out in a depth of 14 fathoms ($25^{m}6$), coarse sand, and good holding ground, but at an inconvenient distance from the shore for landing.

Landing has been effected by means of surf boats in the bight between the rocks off Rocky point and those north-eastward of them; landing with a light boat in fine weather would appear to be moderately easy and safe, and, under any conditions, would be preferable to attempting to land over the bar of Great Fish river.

Coast.—Dangers.—Close within Stalwart point the hills rise to an elevation of 374 feet ($114^{m}0$).

Shoal ground extends for nearly three-quarters of a mile south-eastward, and about 1½ miles north-eastward of Stalwart point, and is reported to be extending seaward; in 1908 it was reported that a vessel struck an obstruction 2 miles distant from the point.

From Stalwart point to the mouth of Keiskama river, 17½ miles north-eastward, the coast has few irregularities, no anchorage affording any shelter, and no known off-lying dangers.

Between Stalwart point (*Lat. 33° 28′ S., Long. 27° 13′ E.*) and the mouth of Begha river, about 7 miles north-eastward, the coast is fringed in places with ledges and rocks, both sunken and awash, of

Chart 3769.

which the outermost lies 2½ cables offshore; the sea breaks some distance outside these dangers.

About 2 miles north-eastward of Stalwart point is the mouth of Impequin river, which is generally closed; near its western entrance point is a dark, bushy hill, 131 feet ($39^{m}9$) high, which is partially faced with sand. About 1¾ miles north-eastward of the mouth of Impequin river is the mouth of Umtata river, with an entrance, generally open, between hills of 260 and 149 feet ($79^{m}2$ and $45^{m}4$) high; the latter hill, which forms the eastern entrance point, is faced with sand for a short distance up from its base, its upper parts being covered with dark bush. The mouth of Gualana river, one mile farther north-eastward, is closed.

Between Umtata and Gualana rivers, foul ground, on which the sea usually breaks, extends about 5 cables offshore.

Begha river, about 3 miles north-eastward of the mouth of Gualana river, generally has its mouth closed; the intervening coastal ridge rises steeply from the beach, its elevation gradually increasing as Begha river is approached, and terminates in a high, bare sandhill on the western side of the latter river. Skietkop, a round-topped, grassy hill, 541 feet ($164^{m}9$) high, lies about 3 miles north-north-westward of the mouth of Gualana river. *See* view on chart 2085.

Madagascar reef, which dries about 3 feet ($0^{m}9$), and on which the sea always breaks, lies about one mile eastward of the mouth of Begha river, and about 2 cables offshore; there are depths of 11 fathoms ($20^{m}1$) 2 cables outside the reef.

From the mouth of Begha river, about 2 miles north-eastward to the mouth of Goosha river, a small stream, the entrance to which is closed, and thence to Keiskama point, about 7½ miles farther north-eastward, the coast is a sandy beach, fringed in places with rocks; the sea breaks heavily off this coast in bad weather. A reef, on which in 1938 the remains of a stranded wreck were visible, extends about 5 cables seaward from a position about 3 miles north-eastward of the mouth of Goosha river. The coastal ridge is partially faced with sand and varies from between 40 to 70 feet ($12^{m}2$ to $21^{m}3$) high, the land close within it rising to an elevation of 300 feet ($91^{m}4$), and forming a headland about half a mile westward of Keiskama point; Patos kop, a square, flat-topped, grassy hill, 913 feet ($278^{m}3$) high, lies about 9 miles north-westward of Keiskama point (*Lat. 33° 18′ S., Long. 27° 29′ E.*).

Keiskama point is low, sandy and fringed with rocks; near its extreme is a bushy-topped sandhill, 100 feet ($30^{m}5$) high, which, when seen from near the coast westward of the point, appears like an islet. A rock, awash, lies about one mile south-westward of Keiskama point and 2 cables offshore, and from it a chain of sunken rocks extends for over half a mile south-westward; a shoal spit, with depths of less than 5 fathoms ($9^{m}1$) over it, extends about 6 cables south-eastward from Keiskama point and, with a moderate swell, the sea sometimes breaks heavily on this spit.

Keiskama river.—Landing.—The entrance to Keiskama river, about one mile northward of Keiskama point, is half a cable in width, and opens into a large basin which partially dries; the north-eastern entrance point is fringed with rocks which dry and which extend about one cable offshore.

Charts 2085, 2095, 596, 748a, 2203, 2483.

Chart 3769.

The south-western side of the river entrance is low, flat and sandy, with a remarkable bushy hill, 220 feet (67^{m}1) high, about half a mile west-south-westward of the river mouth ; this hill is prominent from eastward ; about 1½ miles inland, the coastal range attains a height of 300 feet (91^{m}4).

About 3½ miles westward of the river mouth is Hamburg North, a conical grassy hill, 544 feet (165^{m}8) high and conspicuous ; Mount Vale, 928 feet (282^{m}8) high, a prominent hill which resembles a dark coloured bluff, stands about 8 miles north-north-westward of the river entrance.

Hamburg North, Mount Vale and Patoskop, referred to on page 147 are good marks for identifying the river, though no difficulty should be experienced, as it is the most prominent one on this part of the coast.

Although in fine weather, boats may sometimes enter and leave the river in safety, such an occurrence is infrequent, and is always attended with danger as no dependence can be placed on the bar, the depths over which are constantly changing ; in bad weather, the breakers across the entrance extend for over half a mile seaward.

On the western bank of the river are the villages of Hamburg and Bodiam ; the former, about one mile within the entrance, is a popular sea-angling resort ; the latter, about 5 miles inland, is partially in ruins.

Coast.—Beacon.—Between the mouth of Keiskama river and the mouth of Chalumna river, 5½ miles north-eastward, several small rivers enter the sea ; the eastern of these, Kwani river, is closed at low water.

Between Kwani and Chalumna rivers is Chalumna hill with two conspicuous grassy peaks, the higher of which is 428 feet (130^{m}4) high, about three-quarters of a mile inland.

Between the mouths of Chalumna river and Ncera river, 5½ miles north-eastward, the coast is sandy and fringed in places with rocks, of which the outermost is a shoal spit, on which the sea breaks heavily in bad weather, and which extends about 7 cables seaward from a point on the coast about one mile south-westward of Ncera river. The mouths of both Chalumna and Ncera rivers are open at high water ; but the former is completely, and the latter nearly, closed by banks at low water ; the eastern entrance point of the latter river, is a bushy hill, about 150 feet (45^{m}7) high.

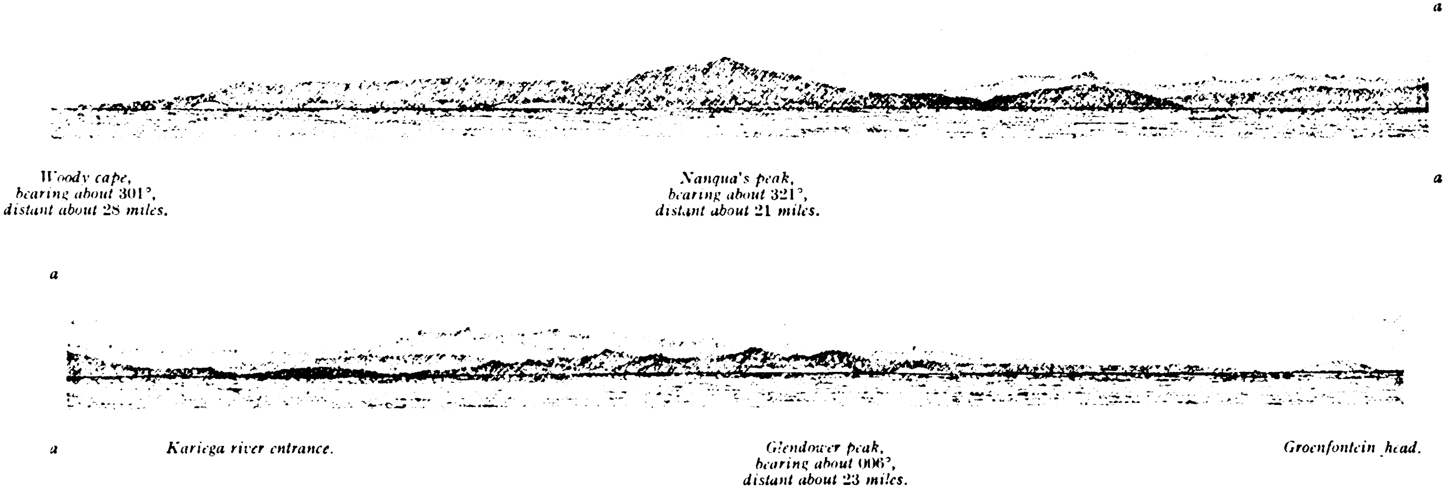
A black pyramidal wooden beacon (*Lat. 33° 09′ S., Long. 27° 40′ E.*), 51 feet (15^{m}5) in height, standing on an equilateral base and terminating in a sharp point, is situated at an elevation of 380 feet (115^{m}8), on a hill, 1¼ miles northward of the mouth of Ncera river ; it is conspicuous.

Coast.—The mouth of Igulu river, about 4½ miles north-eastward of the mouth of Ncera river, is generally open at high water ; there are several sunken rocks off the entrance and a rock with less than 6 feet (1^{m}8) over it, lies about 3 cables offshore about one mile south-westward of the river mouth. A bushy peak, 185 feet (56^{m}4) high, forms the eastern entrance point of a small river, midway between the mouths of Ncera and Igulu rivers, and there is a hill, 451 feet (137^{m}5) high, covered with bush, about one mile westward of the mouth of Igulu river.

The mouth of Igoda river, 2½ miles north eastward of the mouth of Igulu river, is also open at high water ; the coast between these

Charts 2095, 596, 748a, 2203, 2483.

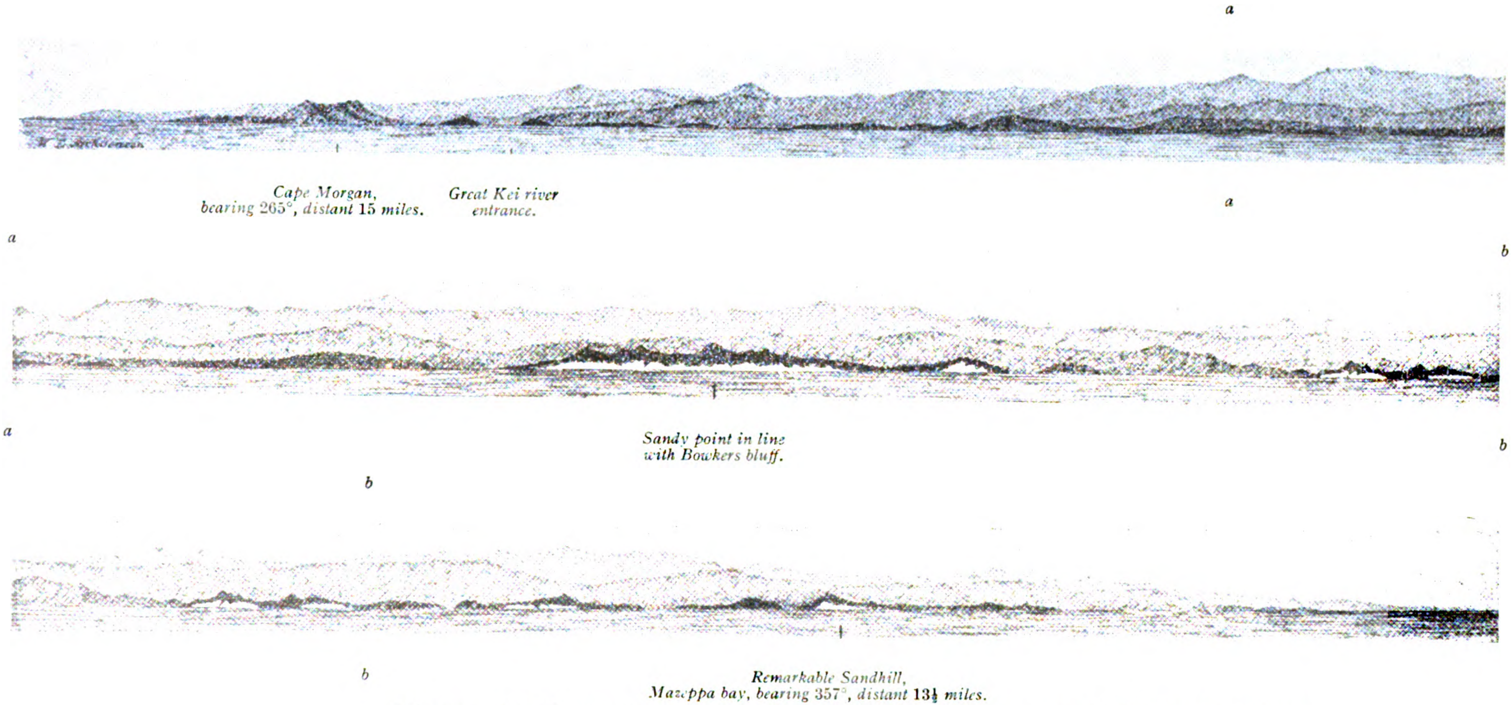
To face page 148.



View in 2 parts, between Woody cape and Glendower peak.

(Original dated 1868.)

To face page 149.



View, in 3 parts, between Cape Morgan and Mazeppa bay.

(*Original dated* 1868.)

Chart 3769.

rivers is fringed with rocks, and the coastal ridge is faced with sand and covered with bush. Sunken rocks extend about 2 cables seaward from the eastern entrance point of Igoda river (*Lat. 33° 06′ S., Long. 27° 47′ E.*).

On the western entrance point of Igoda river is a hill, about 120 feet ($36^{m}6$) high, its lower parts faced with sand, and its upper parts covered with bush. Igoda point, the eastern entrance point of that river, is a slightly projecting bluff, with a rounded grassy summit, 370 feet ($112^{m}8$) high; about three-quarters of a mile within Igoda point is a remarkable hill with two summits, 435 and 452 feet ($132^{m}6$ and $137^{m}8$) high, which is prominent from all directions.

Charts 3769, 3770.

About 2½ miles north-eastward of Igoda point is Cove rock, a quoin-shaped rock, 86 feet ($26^{m}2$) high, with a deep notch in the middle; it forms the extremity of a wide sandy spit extending from a conspicuous bushy-topped sandhill, by name Bisserton, 281 feet ($85^{m}6$) high. From a distance, Cove rock resembles an islet, and it makes a good mark when coasting; its southern and eastern sides are fringed with rocks on which the sea generally breaks.

Between Cove rock and Hood point, about 5 miles north-eastward, the coast assumes a more pleasant aspect and bare sandhills are infrequent, and generally have such remarkable forms as to be very noticeable. Several small streams enter the sea on this stretch of coast, which is fringed with rocks but has no off-lying dangers.

Rifle range.—The danger area of a rifle range, 1¼ miles south-westward of Hood point, extends 2 miles seaward. From one hour before firing commences until the completion of the practice, a large red flag is displayed from each of three 30-foot ($9^{m}1$) masts, one in the centre, and one at each extremity, of the rear of the range.

Chart 1843, Approaches to East London harbour.

Hood point. — Light. — Radiobeacon. — Fog signal. — Hood point is low and rocky but rises steeply from the beach to a ridge 107 feet ($32^{m}6$) high, which is covered with grass and bush.

A light (*Lat. 33° 02′ S., Long. 27° 54′ E.*) is exhibited, at an elevation of 180 feet ($54^{m}9$), from a white cylindrical tower, with a red lantern 62 feet ($18^{m}9$) in height, situated about 1¾ cables within the point.

A radiobeacon is established at the lighthouse.

A fog signal is operated from this lighthouse when fog approaches within 3 miles, or at any time on request by radio to the Port Captain, East London.

EAST LONDON HARBOUR AND APPROACHES.—Danger.—Shoals.—Between Hood point and Castle point, the southern entrance point of Buffalo river, about 1¼ miles north-eastward, the coast is low and rocky, and depths of less than 5 fathoms ($9^{m}1$), over which the sea breaks in bad weather, extend offshore as much as half a mile in places; several rocks are situated south-eastward of Castle point, the outermost being about 1½ cables off the point.

A stranded wreck, the remains of which were prominent from seaward in 1948, lies 2½ cables north-eastward of Hood point.

Chart 1843, plan of East London harbour.

East London harbour is at the entrance to Buffalo river, which rises in the Amatola mountains and is tidal for about 3½ miles from

Chart 1843, plan of East London harbour.

its mouth. The entrance is sheltered by two breakwaters, and passenger and cargo vessels up to 750 feet (228m6) and oil tankers up to 550 feet (167m6) in length can be accommodated at wharves on both banks of the river close within the entrance. About one mile within the entrance the river is spanned by a bridge, above which it is shallow and navigation is restricted to boats.

There is a bar at the entrance, the surf on which sometimes breaks, and is occasionally impassable. The bar is kept dredged to 50 feet (15m2). The entrance channel along the leading line is maintained at 35 feet (10m7).

Chart 1843, Approaches to East London harbour.

Between the mouths of Buffalo and Inkyanza rivers, 1¼ miles north-north-eastward, and thence 1½ miles east-north-eastward to Nahoon point, the coast is rocky except close to the mouth of Inkyanza river, where a sandy beach extends for about half a mile; eastward of this river, the cliffs are rugged and from 20 to 50 feet (6m1 to 15m2) high, with a few off-lying sunken rocks. Within the coast, the land northward of Buffalo river rises gradually to an elevation of about 150 feet (45m7), at half a mile inland, while, eastward of the mouth of Inkyanza river, the coast as far as Nahoon point is backed by a wooded ridge rising to an elevation of over 200 feet (61m0), with a conspicuous hill, known as Sand Kop Trig 289 feet (88m1) high, faced with sand nearly to its summit, near its south-western end.

A rocky spit, on which the sea breaks heavily, extends about 3½ cables south-eastward of Nahoon point, which should be given a wide berth.

Chart 1843, plan of East London harbour.

Lights.—Fog signal.—A light is exhibited, at an elevation of 52 feet (15m9), on the head of South breakwater.

A fog signal is sounded from a position near the light-structure.

A light is exhibited at an elevation of 35 feet (10m7) from a circular iron tower painted in black and white bands on the head of East breakwater.

Leading lights are shown from within Castle point. The front light is exhibited, at an elevation of 30 feet (9m1), from a white iron framework tower, 27 feet (8m2) in height, situated close northward of the old lighthouse within the root of South breakwater. The rear light is exhibited, at an elevation of 96 feet (29m3), from a steel column, painted in black and white horizontal bands and surmounted by an inverted triangle, 46 feet (14m0) in height, situated about 1¼ cables west-south-westward of the front light.

Chart 1843, Approaches to East London harbour.

A light is exhibited at an elevation of 88 feet (26m8), from a white iron column 37 feet (11m3) in height, situated about 8 cables north-north-eastward of the front leading light.

A light for the use of aircraft is exhibited, at an elevation of 210 feet (64m0), from the top of each of two radio masts, situated on the southern bank of the river, about one mile westward of the front leading light.

Anchorage.—In westerly or south-westerly winds, good anchorage may be obtained in 10 fathoms (18m3), with Hood Point lighthouse (*Lat. 33° 02′ S., Long. 27° 54′ E.*) bearing 237°, and the lighthouse, *Chart 1843, Approaches to East London harbour.*

northward of the river entrance, bearing 295°. Vessels are recommended not to anchor southward of the river entrance, or, at night, southward of the line of the leading lights.

The anchorage is considerably exposed, and vessels generally lie broadside to the sea, and so roll and strain to a great extent; power vessels making a short stay may anchor nearer the breakwater, but any vessel running the risk of lying at the anchorage in bad weather, should on no account anchor in a depth of less than 12 fathoms (21^{m}9).

Rollers, which seldom set in during the summer months, are frequent during winter; they generally break in about 3 fathoms (5^{m}5), but during gales, in about 5 fathoms (9^{m}1), and sometimes even in 7 or 8 fathoms (12^{m}8 or 14^{m}6).

One lighter is kept for use in emergency, but all vessels are taken into harbour as soon as possible after arrival in daylight hours.

Tidal streams.—The in-going tidal stream sets across the bar and into the river at the rate of about three-quarters of a knot; the out-going tidal stream has a velocity of about one knot, except during freshets, when it may be stronger. The streams turn at about the times of high and low water, setting inwards on the rising tide.

Current.—At the anchorage, the current generally sets south-westward at from one to 2½ knots, but in calm weather or during strong south-westerly winds, the surface water is retarded, and occasionally sets eastward at about half a knot or even more.

Inshore, near the edge of the breakers, an eddy current frequently sets eastward; this current varies in strength, but seldom attains a rate of half a knot. In the offing, at about 15 miles from the coast, the regular Agulhas current sets steadily south-westward at rates of from 2 to 4 knots.

It has been reported that, after southerly or south-easterly gales, an in-setting current of variable strength is frequently experienced off this part of the coast.

Charts 1843, 3769, 3770.

Directions.—Near the coast, about 15 miles on either side of Buffalo river, is a beacon, *see* pages 148 and 155, which serves to identify the coast.

Vessels from south-westward should not approach the coast within 2 miles until close to the port, when Hood Point lighthouse and a bluff, 150 feet (45^{m}7) high, on the north bank of the river, may be identified. The Beach hotel, about 7 cables north-north-eastward of the front leading light, and two spires in the town about a mile west-north-westward of it, are also conspicuous.

In order to avoid the dangers extending off Nahoon point, *see* page 150, vessels from north-eastward should approach Hood Point lighthouse (*Lat. 33° 02′ S., Long. 27° 54′ E.*) on bearings of not less than 239°, on which bearing they will pass 8 cables off the point.

The spire of the City Hall, the southern of the two spires mentioned above, in line with the Beach hotel, and bearing about 284°, is recommended as a good leading mark for approaching the river entrance.

The two leading beacons, and at night their lights, in line bearing 252°, lead over the bar in the centre of the channel. When in line, the triangle on the rear beacon is difficult to distinguish, on account of a white house in the background.

Charts 2095, 596, 748a, 2203, 2483.

Chart 1843, plan of East London harbour.

Signal station.—Signals.—A signal station, at which day and night watch is kept, is situated on Timeball hill, also known as Signal hill (*Lat. 33° 01′ S., Long. 27° 55′ E.*) about 3½ cables north-northwestward of the front leading light. Vessels should communicate with the signal station on arrival either by visual signals or by radio. Two tugs and a pilot launch are fitted with radio-telephony for local communication with the signal station.

All port signals must be answered and strictly obeyed by vessels; vessels disregarding them will be reported to Lloyds and also to their owners.

The following signals are shown from the signal station :—

Cone halfway up to yard-arm .	Bar dangerous.
Cone at yard-arm, or by night a *red* light	Bar impassable.
Flag I of the International Code of Signals at the yard-arm, or by night 2 *green* lights, disposed vertically	Keep clear of in-coming vessel.
Flag H of the International Code of Signals at the yard-arm, or by night 2 *red* lights, disposed vertically	Keep clear of out-going vessel.

Signals to stranded vessels are as shown in Appendix E of the International Code of Signals.

Pilots.—Pilotage is compulsory for merchant vessels and no stranger should attempt to cross the bar without a pilot; Government pilots board all vessels at the anchorage.

Chart 1843, Approaches to East London harbour.

Port limits.—Port regulations.—The following are the limits of the port under the harbour authorities :—The area included within a line drawn 115° from Hood point for 1½ miles; from the south-eastern end of that line to a point situated one mile 115° from Nahoon point; and from the last named position to Nahoon point. Also the whole area of the tidal waters of Buffalo river and its tributaries.

The General Regulations for the Harbours of the Union of South Africa are in force at East London; a copy of these regulations should always be obtained on arrival, *see* page 36.

Chart 1843, plan of East London harbour.

Harbour entrance. — Wharfage. — Depths. — The entrance is protected by two breakwaters, of which South breakwater extends eastward from Castle point for about 3,180 feet ($969^{m}3$). East breakwater extends south-eastward for 1,200 feet ($365^{m}8$) from a position on the north bank about 2¾ cables northward of Castle point.

Wharves and jetties extend along both banks of the river from close within the entrance to the bridge at the head of the harbour. The turning basin is situated close within the roots of the breakwaters and has a greatest width of 960 feet ($292^{m}6$), with general depths in the area of from 29 to 49 feet ($8^{m}8$ to $14^{m}9$).

From seaward up the river, the wharfage is as follows :—

On the northern bank : No. 6 wharf forms the northern side of the turning basin and is 1,660 feet ($506^{m}0$) in length, with a depth alongside of 28 feet ($8^{m}5$).

Chart 1843, plan of East London harbour.

No. 5 wharf is 275 feet (83^m8) in length, with a depth alongside of 30 feet (9^m1).

No. 4 wharf, Hely Hutchinson wharf, is 433 feet (132^m0) in length, with a depth alongside of about 25 feet (7^m6).

No. 3 wharf is 1,180 feet (359^m7) in length, with a depth alongside of 32 feet (9^m8).

No. 2 wharf is 573 feet (174^m7) in length, with a depth alongside of 32 feet (9^m8).

Export wharf is 360 feet (109^m7) in length, with a depth alongside of 8 feet (2^m4).

No. 1 wharf is 170 feet (51^m8) in length, with a depth alongside of 30 feet (9^m1). The remainder of the wharf has still to be constructed.

The Passenger landing jetty (*Lat. 33° 01′ S., Long. 27° 54′ E.*) is 283 feet (86^m3) in length, with a depth alongside of 13 feet (4^m0).

Fish wharf is situated close below the bridge at the head of the harbour; it is 360 feet (109^m7) in length, with a depth alongside of 20 feet (6^m1).

On the southern bank: Tug berth, on the southern side of the turning basin, is 95 feet (29^m0) in length, with a depth alongside of 18 feet (5^m5).

Oil tanker berth, close westward of Tug berth and on the southern side of the turning basin, is 454 feet (138^m4) in length, with a depth alongside of 30 feet (9^m1).

Coaling wharf, opposite No. 4 wharf is 228 feet (69^m5) in length, with a depth alongside of 21 feet (6^m4); there is a Temperley transporter on this wharf.

Repair wharf and Floating Plant jetty, opposite No. 3 wharf, are 105 feet (32^m0) and 41 feet (12^m5), respectively, in length, with a depth alongside of 18 feet (5^m5).

Slipway wharf, opposite No. 3 wharf, is 263 feet (80^m2) in length, with a depth alongside of 15 feet (4^m6).

Timber wharf No. 1, opposite No. 2 wharf, is 300 feet (91^m4) in length with a depth alongside of 24 feet (7^m3).

West quay, opposite Nos. 1 and 2 wharves, is 1,500 feet (457^m2) in length, with a depth alongside of 27 feet 9 inches (8^m4).

Timber wharf No. 2, opposite the Fish wharf, is 300 feet (91^m4) in length, with a depth of 23 feet (7^m0) alongside.

Port facilities.—All the wharves and jetties are connected to the general railway system, and Nos. 3, 4 and 6 wharves and West quay are equipped with cranes of from 3 to 5 tons lifting capacity; in addition, there is a 10-ton crane on No. 3 wharf, a 15-ton crane on No. 6 wharf and a 20-ton crane on West quay (*Lat. 33° 02′ S., Long. 27° 54′ E.*).

One lighter is available.

Supplies.—About 100 tons of South African coal is usually kept in stock, and large quantities can be obtained with about 10 days notice.

Fuel oil is available.

Fresh provisions are plentiful; water is laid on at all wharves and jetties.

Tugs.—There are two powerful tugs, fitted with salvage appliances and radio; there are also two small craft, one of which is fitted with radio.

Ships' boats are not allowed to cross the bar.

Charts 3769, 3770, 2095, 596, 748a, 2203, 2483.

Chart 1843, plan of East London harbour.

Repairs.—Large repairs to machinery and boilers can be executed.

Princess Elizabeth dry dock, situated on the northern bank at the western end of the harbour, is capable of accommodating large vessels and is equipped with 2 15-ton cranes and one 5-ton crane. *See* Appendix II.

There is a patent slip on the southern bank of the river opposite No. 3 wharf.

Town.—The town of East London stands on a wide plateau at an elevation of about 200 feet ($61^{m}0$), on both sides of Buffalo river. The part of the town situated on the southern bank is known as West Bank, and is connected to East London by a double-decked combined road and rail bridge at the head of the harbour. In 1951, the population was 92,000.

During the year 1950-51, 783 vessels, other than fishing vessels, with an aggregate tonnage of 6,720,108 tons, visited the port.

There is a Government hospital at which seamen can be accommodated.

Life-saving.—A line-throwing apparatus is maintained on each side of the entrance to Buffalo river.

Communications.—East London is connected to the general railway, telegraphic, and telephonic systems, and there is regular communication by sea with other South African ports, and with Europe.

There is a regular air service with Durban, Port Elizabeth and Capetown.

Climatic table.—*See* page 68.

Chart 3770.

NAHOON POINT TO BASHEE POINT.—Landings.—Between Nahoon point and Bashee point, the coast is a succession of rocky points with sandy beaches between them, on which the sea breaks heavily, so that very few places offer any chance of a successful landing even in the finest weather. Of such exceptional places, the following three may be mentioned:—

About 9 cables northward of Nahoon point is a small sandy bight, where it is stated that landing might be effected in case of emergency during westerly gales; at Gonubie point, about 5½ miles north-eastward of Nahoon point, landing on the south-eastern side of the bight northward of the former point, might possibly be practicable at times, and at the mouth of Kwelegha river, about 3 miles farther north-eastward, landing is practicable on the south side of the river mouth during westerly winds and with a moderate swell.

Coast.—Dangers.—About 8 cables northward of Nahoon point is the mouth of Nahoon river, which is generally open at high water and is tidal for about 3 miles; a bushy peak, 80 feet ($24^{m}4$) high, lies close southward of its mouth.

From the mouth of Nahoon river to Danger point, about 2 miles north-eastward, the coastal ridge is steep and rises to an elevation of 226 feet ($68^{m}9$) close within the point, and is faced with sand extending to its summit; Danger point is low, sandy and fringed with rocks, and Quinera (Quenera) river enters the sea about one mile south-westward of it.

A reef, which dries one foot ($0^{m}3$), lies about 4 cables off Danger point, with depths of 10 fathoms ($18^{m}3$), about 2 cables outside it.

Charts 3769, 2095, 596, 748a, 2203, 2483.

Chart 3770.

Between Danger point and Gonubie point, about 3 miles north-eastward, two small rivers enter the sea; close southward of Gonubie point, the coast is fringed with a ledge of rocks outside which the depths are irregular, and in bad weather, the sea breaks about 3 cables offshore. Gonubie river is tidal for about 3 miles and enters the sea about half a mile northward of Gonubie point (*Lat. 32° 57′ S., Long. 28° 02′ E.*); its mouth is open at high water.

Kwelegha point, which is low and rocky, is about 3 miles north-eastward of Gonubie point; a bushy peak, named Sharp peak, 255 feet ($77^{m}7$) high, inclining eastward, and from its remarkable shape very conspicuous, is situated close to the coast about 8 cables westward of Kwelegha point. Rocks awash and with less than 6 feet ($1^{m}8$) over them, extend nearly 4 cables east-south-eastward of the point.

The mouths of Kwelegha and Bulura (Bolegha) rivers, situated close northward, and 1½ miles north-eastward, respectively, of Kwelegha point, are both usually open; on the western bank of the latter river is a conspicuous, bushy dome-shaped hill, 244 feet ($74^{m}4$) high, faced with sand a short way up, and near its mouth there is another dome-shaped peak.

Reef point, about 4 miles north-eastward of Kwelegha point, has two rocky horns, between which is a sandy beach backed by hills rising to an elevation of 314 feet ($95^{m}7$). Rocks awash extend about 3 cables from the point, off which the sea breaks at about half a mile offshore.

Beacon.—A conspicuous black wooden pyramidal beacon, 52 feet ($15^{m}8$) in height, surmounted by a ball, stands on a hill, 314 feet ($95^{m}7$) high, about 4 cables north-westward of Reef point.

Coast.—Between Reef point and Cape Henderson, about 6½ miles north-eastward, four small rivers, named Cintza (Cintsa), Kefani (Kafani), Kwenurha (Kwenxura) and Inyarha (Naagh), enter the sea; the two former are usually closed, and over the western entrance point of Inyarha river, is a bushy hill, 130 feet ($39^{m}6$) high, and faced with sand nearly to its summit; it is conspicuous as there is not another sandhill of note for 25 miles north-eastward. The coastal ridge within this stretch of coast is high, bushy, and faced with sand for some distance up from its base, and the land close within it rises to elevations of from 350 to over 400 feet ($106^{m}7$ to over $121^{m}9$). Vis Kop, a round dome-shaped hill, 496 feet ($151^{m}2$) high, between the mouths of Kefani and Kwenurha rivers, is prominent.

Cape Henderson (*Lat. 32° 47′ S., Long. 28° 13′ E.*), although not projecting from the adjacent coastline to any extent, rises steeply from a rocky beach to an elevation of 490 feet ($149^{m}4$), and is covered with grass; it appears as a dark bluff.

Imtwendwe river enters the sea about 1½ miles north-eastward of Cape Henderson, its western entrance point being a headland, 451 feet ($137^{m}5$) high; off its eastern entrance point are three sunken rocks, over which the sea breaks in bad weather, the outermost being about 2½ cables offshore. About a mile farther north-eastward is the mouth of Haga Haga river, with a village of the same name close westward of it; on the hillside above the village, is the name " Haga Haga " in large white letters.

From the mouth of Haga Haga river for about a mile north-eastward to Flat point, and thence for about another mile north-eastward

Charts 2095, 596, 748a, 2203, 2483.

Chart 3770.

to the mouth of Umtwendwe river, the land within the coast rises gradually to an elevation of 373 feet (113^{m}7), at about one mile inland, and is covered with grass with a fringe of bush along the coast; eastward of Umtwendwe river, the elevation of the land greatly increases.

Coast.—Quku, or Double Mouth river, enters the sea about 3 miles north-eastward of Flat point; its mouth is generally open and it is tidal for about 1½ miles and is joined by Gonewaan river close within its entrance. About 6 cables north-eastward of the mouth of Quku river, there are a few rocks about a cable offshore.

Between the mouth of Quku river and Morgan bay, about 2 miles north-eastward, the coast consists of irregular precipitous cliffs, varying from 140 to 250 feet (42^{m}7 to 76^{m}2) high; Incarha river enters the sea in Morgan bay, and near its western entrance point is the village of Morgan bay. The village is noticeable from seaward.

Cape Morgan, close eastward of the mouth of Incarha river, is broad, low and rocky. The land close within its extreme rises steeply to an elevation of 275 feet (83^{m}8), and then slopes gradually to a height of 404 feet (123^{m}1), at half a mile inland; viewed from seaward, Cape Morgan resembles a flat-topped hill covered with bush. *See* view facing page 149.

Dangers.—Rocks, above-water and awash, extend about 3 cables southward of Cape Morgan, and about the same distance outside them are two shoals, with a least depth of 3 fathoms (5^{m}5) over them; these shoals only break in moderate or bad weather, and care is necessary that the breakers on the rocks off the point are not mistaken for the outer shoals.

Anchorage.—Shelter from north-westerly and westerly winds may be obtained at from 5 to 8 cables north-eastward of Cape Morgan, and at the same distance offshore, and under favourable circumstances, landing might be effected.

Coast.—Landing.—Caution.—Great Kei river enters the sea about 2 miles north-north-eastward of Cape Morgan, the intervening beach being fringed with rocky ledges which extend about one cable offshore; about midway along this beach is the mouth of Igwili river, which is closed. Kei kop (*Lat. 32° 38′ S., Long. 28° 20′ E.*), a round-topped hill, 874 feet (266^{m}4) high, about 4½ miles northward of Cape Morgan, is the highest hill in this neighbourhood, and is visible from most directions.

Near the mouth of Igwili river is a sandy beach, which is to some extent sheltered by sunken rocks. If attempting to land on this beach during the period that the in-going tidal stream is entering Great Kei river, care must be taken that the boat be not swept too far north-eastward while awaiting an opportunity to land. On one occasion, when a boat was swamped when endeavouring to pass through the surf, it was not thrown on the beach by the rollers, but carried north-eastward by the in-going tidal stream into the breakers on the bar, and thence into the river. Equal care is necessary during the period of the out-going tidal stream, that a boat be not drifted south-westward, where the surf is much heavier, and the beach rocky.

Great Kei river.—Dangers.—Great Kei river is rapid and dangerous, and has an entrance about half a cable wide. It is broad and deep for about 6 miles within the entrance, and tidal for about

Charts 2095, 596, 748a, 2203, 2483.

Chart 3770.

the same distance; near its western entrance point is the village of Keimouth, which is conspicuous from seaward. Great Kei river bar is of a shifting nature and scarcely ever passable, the breakers extending about half a mile eastward of the entrance. In 1934, the channel was near the northern shore, and had heavy breakers with only a moderate swell. Except in emergency, no attempt should be made to enter the river or to land, without local knowledge.

Snag rocks, a group of rocks, the highest of which is 10 feet (3^{m}0) high, lies between 5 and 8 cables off the mouth of Great Kei river, and a chain of rocks, sunken and awash, extends nearly 5 cables north-eastward of Snag rocks; the sea breaks heavily all round these rocks, and in bad weather, as much as 3 cables outside them.

Anchorage.—Tidal streams.—Current.—Although it cannot be recommended, temporary anchorage may be obtained eastward of Snag rocks, in depths of from 10 to 16 fathoms (18^{m}3 to 29^{m}3).

Close inshore, the tidal stream sets north-eastward during the rising and south-westward during the falling tide.

About 6 cables off Great Kei river entrance, the current sets south-westward with a velocity of 1½ knots. During calm weather and with westerly winds, the discoloured water from the river extends north-eastward, having a definite outer edge about half a mile offshore.

Coast.—From the mouth of Great Kei river for three-quarters of a mile north-eastward to the mouth of Gxara river, the coast consists of a beach fringed with rocks, within which the land is grassy, with numerous patches of thick bush; Gxara river is small and its mouth is generally closed.

The entrance to Qolora (Colora) river, about 2½ miles north-eastward of the mouth of Gxara river, is usually open at high water; a sandspit extends from the north-eastern entrance point nearly across its mouth, leaving a small channel close to the south-western entrance point, and several sunken rocks and a ledge which dries, lie close offshore southward of the entrance. There is a village (*Lat.* 32° 38′ *S., Long.* 28° 26′ *E.*) close to the river's mouth.

Landing in surf boats is sometimes practicable in a sandy bay, 1½ miles north-eastward of the mouth of Great Kei river, and also on a beach near the mouth of Qolora river.

From about one mile south-westward to 4 miles north-eastward of the mouth of Qolora river, the coast is grassy and covered with small hillocks, about 10 feet (3^{m}0) in height, and clothed with stunted bush; these hillocks were formerly ant hills, and when seen from a distance of 4 or 5 miles, they form a characteristic feature of this stretch of coast.

Between the mouths of Qolora and Kobonqaba (Kobongaba) rivers, about 3½ miles east-north-eastward, the beach is fringed with rocks. The mouth of Kobonqaba river is always open and is tidal for 3 miles; a sunken rock, over which the sea breaks, lies 2½ cables south-eastward of its entrance, and a rock which dries, lies close off its eastern entrance point.

Kobonqaba (Kobongaba) point, about three-quarters of a mile east-north-eastward of the mouth of Kobonqaba river, is high and steep, the land attaining an elevation of 307 feet (93^{m}6) about 3 cables inland; several rocks, which dry, lie close off the point.

Charts 2095, 596, 748a, 2203, 2483.

Chart 3770.

The mouth of Nxaxo (Nxara) river, about 1½ miles north-eastward of Kobonqaba point, is generally open, and its western entrance point is low. The north-eastern entrance point rises to a sandhill about 240 feet ($73^{m}1$) high, covered with bush, with a sandy spit extending from it nearly across to the western bank, leaving only a narrow entrance channel.

Between the mouth of Nxaxo river and Sandy point, about 1½ miles east-north-eastward, the coastal hills rise steeply from the sandy beach and form a ridge, known as Bowker's Bluff, which is covered with dark bush and faced with sand for some distance upwards. This bluff, which extends about 2 miles from the mouth of Nxaxo river to about half a mile beyond Sandy point, has four distinct peaks, of which the highest, 299 feet ($91^{m}1$) high, is the third from westward and is conspicuous.

Bowker's bay.—Anchorage.—Bowker's bay is entered between Sandy point (*Lat. 32° 34′ S., Long. 28° 33′ E.*) and Stony point, about 4 miles north-eastward.

In 1877, it was reported that good anchorage was obtained in a depth of 63 feet ($19^{m}2$) sand, about 1½ miles north-eastward of Sandy point, and abreast a stream, called Mcetyana river, the mouth of which is closed by a sandbank. Landing was effected in safety on this sandbank, and on the adjacent beach, which latter lies at the foot of a remarkable raised sand beach, by a whale boat, manned by experienced boatmen. The report stated that this appeared to be the best anchorage on the portion of the coast examined, and certainly the safest place for landing. The bay was examined under favourable circumstances, and the surf broke over depths of 3 fathom ($5^{m}5$) abreast the landing place. During November 1934, the best place for landing appeared to be about 2½ cables southward of the river mouth, close northward of the end of a rocky beach.

Coast.—Danger.—The mouth of Cebe river about one mile west-south-westward of Stony point, and the mouth of Umtamfuna (Gqunge) river, about 3½ cables farther eastward, are both open at high water; these river mouths are separated by a rocky point within which is a bushy peak, 244 feet ($74^{m}4$) high, which is faced with sand for about 40 feet ($12^{m}2$) upwards from its base, and which, when viewed from some distance, appears to have a double summit. A rock, over which the sea breaks, lies close southward of the mouth of Cebe river.

Between the mouth of Umtamfuna river and Stony point, the coast is fringed with rocks which extend about a cable offshore.

A reef of sunken rocks, on which the sea breaks, and on the northern part of which is a detached rock, 6 feet ($1^{m}8$) high, extends for over half a mile southward of Stony point.

Between Stony point and the mouth of Manubie (Nqwara) river, about 1½ miles north-eastward, the coast is low, rocky, and fringed with rocks; midway between them, is the mouth of Umtilwane river, which is almost closed.

The mouth of Manubie river is open at high water, the channel being close to the western entrance point, which is 127 feet ($38^{m}7$) high, and covered with bush; the eastern entrance point is formed by the steep termination of the coastal ridge, and is low and has a sandy spit extending from it nearly across the entrance. Several rocks lie about 4 cables eastward of the river's mouth and about a cable offshore.

Charts 2095, 596, 748a, 2203, 2483.

Chart 3770.

Mazeppa point lies about 2 miles north-eastward of the mouth of Manubie river, the intervening coast as well as the point being fringed with rocks; in bad weather, the sea breaks some distance off it. Mazeppa point may be identified by a grassy islet, 42 feet (12^{m}8) high, lying close inshore, less than half a mile northward of it. There is a village situated close within the point, westward of which is the mouth of Kleena river, which is open at high water.

Mazeppa bay is entered between Mazeppa point and the mouth of Qora river, about 2 miles north-eastward. At the head of the bay is a sandy beach, within which is a conspicuous sandhill, 219 feet (66^{m}7) high. *See* view facing page 149. Landing is sometimes practicable on this beach in fine weather, the best place being close eastward of the mouth of Nebelele river (*Lat. 32° 28′ S., Long. 28° 39′ E.*), about 1¼ miles northward of Mazeppa point, but in bad weather, rollers extend right across the bay; the mouth of Nebelele river is closed.

The mouth of Qora river is always open and the river is tidal for 4 or 5 miles; a sandy spit extends nearly right across its mouth from its western entrance point which is 167 feet (50^{m}9) high, and covered with bush.. The eastern entrance point is rocky and projects south-westward from the base of a bushy hill, 87 feet (26^{m}5) high; a rock which dries, lies about half a cable off the point, and a rocky spit extends about 2 cables seaward of the entrance. There are a large number of noticeable huts close eastward of the river mouth. The river banks are high and steep, and Manubie forest commences on the right bank about 2 miles within the entrance, and extends north-westward about 1½ miles parallel with the river, being about 1½ miles wide. *See* view facing page 162.

About three-quarters of a mile north-eastward of the mouth of Qora river is a low, rocky point, off which is a sunken rock; a ledge of rocks, 3 feet (0^{m}9) high, and several rocks which dry, lie close off the intervening coast.

The mouth of Jujura river, about 1½ miles north-eastward of the mouth of Qora river, is generally open and has a low and rocky western entrance point. A short distance within its eastern entrance point is a dark bushy headland, about 90 feet (27^{m}4) high, from the base of which a sandspit extends nearly across the river, leaving only a narrow channel.

About one mile north-eastward of the mouth of Jujura river is the mouth of Ngadhla river, which is generally open at high water; a sunken rock lies half a cable from its western entrance point, and on the extremity of the latter, there is a green hummock, 15 feet (4^{m}6) high. The coast thence to the mouth of Shixini river, about 1¼ miles north-eastward, consists of sandy hillocks covered with bush, rising to an elevation of 200 feet (61^{m}0) at half a mile inland; about midway along this stretch of coast and a short distance offshore, are some sunken rocks.

Charts 3770, 3793.

The mouth of Shixini river is generally open, the channel running close to the western entrance point which rises steeply to a peak, 187 feet (57^{m}0) high; the eastern entrance point is low, and is fronted by a sandy beach. Between the mouth of Shixini river and Shixini point, about one mile east-north-eastward, there is a

Charts 3770, 3793.

black headland, within which the land rises steeply to an elevation of 303 feet ($92^{m}3$).

Shixini point is about 50 feet ($15^{m}2$) high, and is connected to the coastal ridge by a neck of sand, which is bushy; when seen from near the coast, it resembles an islet. Between Shixini point and the mouth of Nqabara river, about 4 miles north-eastward, are the mouths of Nqabe (Gnabie), Goqo, and Nocekedwa rivers, at about 1½, 2 and 3¼ miles, respectively, from Shixini point; a rock awash lies about 3 cables offshore at half a mile east-north-eastward of the mouth of Nqabe river, and the coast between the mouths of Goqo and Nqabara rivers, is fringed with rocks.

Nqabara river has a wide entrance and is tidal for about 5 miles; close within its western entrance point, it is joined by Nqabarana river, a smaller stream.

Between the mouth of Nqabara river and Nqabara point (*Lat. 32° 20′ S., Long. 28° 49′ E.*), about 1½ miles north-eastward, the coast is rocky, and the land rises to from 200 to 300 feet ($61^{m}0$ to $91^{m}4$), about 3 cables inland, and is broken by several ravines.

Chart 3793.

From Nqabara point to the mouth of Ngoma (Ingomana), river about 1½ miles north-eastward, and thence half a mile farther north-eastward to the mouth of Kabole river, the coast rises steeply to about 200 feet ($61^{m}0$), about 3 cables inland; between the mouths of these two rivers there is a rocky point. From the mouth of Kabole river, a sandy beach extends for about half a mile to Udwesa point, (Dwessa head), a dark, grassy-topped bluff, with cliffs about 100 feet ($30^{m}5$) high, rising to 331 feet ($100^{m}9$), about 4 cables inland. From Udwesa point to Amendu point, about 2 miles north-eastward, the coast is low, and fringed in places with rocks. Between Ngoma and Bashee rivers, Udwesa forest covers an area from close within the coast to about 2½ miles inland.

Amendu point is low and rocky, with a grassy hillock about 25 feet ($7^{m}6$) high, on it; there are several detached rocks close off the point, and a sunken rock about 2½ cables off it. Close westward of the point is the mouth of Amendu river, which is closed by a sandy spit which extends across it from the eastern entrance point; a hill, 115 feet ($35^{m}0$) high, stands close to its western entrance point.

Between Amendu point and the mouth of Bashee river about 2 miles north-eastward, the coastal hills are covered with bush and are about 60 feet ($18^{m}3$) high, the land within rising to from 200 to 250 feet ($61^{m}0$ to $76^{m}2$), about 4 cables inland, and to 821 feet ($250^{m}2$) about 3½ miles from the coast.

Bashee river.—Anchorage.—The entrance to Bashee river (*Lat. 32° 15′ S., Long. 28° 54′ E.*) is about 2½ cables wide, but a sandy spit extends across its mouth from the north-eastern entrance point, leaving a channel close to the south-western bank. In October 1927, this channel was about 150 feet ($45^{m}7$) wide, with depths of 2 or 3 feet ($0^{m}6$ or $0^{m}9$). Close within the entrance there are sandbanks which dry, and which extend for a short distance north-eastward of the channel, which latter runs close to the south-western bank; within the sandbanks, the river is about 1½ cables in width. The sea breaks for 2 cables or more outside the entrance. *See* view facing page 162.

Charts 2095, 596, 748a, 2203, 2483.

Chart 3793.

The south-western entrance point is low and grassy, the land on the western bank rising gradually to a grassy hill, 270 feet ($82^{m}3$) high, about a quarter of a mile within the entrance; the north-eastern entrance point is high and covered with bush. The banks of the river are steep, the western bank being generally free of bush for 1¼ miles above the entrance, at which point is the edge of the Udwesa forest, but the eastern bank, from half a mile within the entrance, is covered with thick bush which merges into dense forest. This forest, which is about 1¾ miles wide, extends from the eastern bank for about 3¼ miles north-eastward, covering the coastal hills about 3 cables inland, except at the river mouths, where it approaches the coast more closely.

In 1877, good anchorage was obtained in a depth of 63 feet ($19^{m}2$) sand, east-south-eastward of the river entrance. Rollers then set in after a strong south-westerly breeze, occasionally breaking in 36 or 42 feet ($11^{m}0$ or $12^{m}8$), but generally in 21 or 24 feet ($6^{m}4$ or $7^{m}3$), off the mouth of the river.

Landing is dangerous, on account of the heavy breakers and the rocky ground off the coast. The rollers occasionally break heavily a considerable distance outside their usual line, without any warning.

Bashee point.—Light.—Beacon.—Bashee point, about a mile north-eastward of the mouth of Bashee river, is low and bushy, with several grassy hummocks; it is fringed with a reef, which dries, outside which several sunken rocks extend nearly 4 cables south-eastward of the point. A sandy beach lies northward of Bashee point, and there are several bungalows between the point and the mouth of Bashee river.

A light is exhibited at an elevation of 155 feet ($47^{m}2$) from an iron framework tower situated about 3 cables westward of the extremity of Bashee point (*Lat. 32° 15′ S., Long. 28° 55′ E.*). Owing to the dark background, the light structure is prominent.

Charts 3793, 3794.

BASHEE POINT TO WATERFALL BLUFF.—Aspect.—The general aspect of the coast between Bashee point and Rame head, about 35 miles north-eastward, is a hard, rocky coast line, with sandy patches in all the bays, backed by three main ridges of hills and mountains. The coast is low as far as the mouth of Bulungula (Bulungulu) river, about 8 miles north-eastward, but then becomes moderately high and steep, with cliffs as much as 300 feet ($91^{m}4$) high, in places. The banks of most of the rivers are heavily wooded, but the hills, except for the forest, described on page 162, are grassy with patches of bush near the kraals and trading stores, most of the latter being surrounded by gum trees.

The coastal ridge rises to between 500 and 700 feet ($152^{m}4$ and $213^{m}4$), at from one to 1½ miles within the coast, while the second ridge, upwards of 1,000 feet ($304^{m}8$) high, lies about 4 miles further inland. The third ridge or plateau, rising to an elevation of over 2,000 feet ($609^{m}6$), and between 10 and 11 miles inland is generally masked by the second ridge when within about 5 miles from the coast. The second and third ridges appear mostly flat and bare with clumps of bushes in places; of these latter, the most conspicuous is on the second ridge at Crocodile Vlei, which stands at an elevation

Charts 2095, 596, 748a, 2203, 2483.

Chart 3793, 3794.

of 1,234 feet ($376^{m}1$), about 16 miles north-eastward of Bashee point, and about 5 miles inland.

Close southward of Rame head, a complete change in the general aspect of the coast and the land within it, takes place. Between Rame head and Waterfall bluff, about 32 miles north-eastward, the coast is mainly high and bold, with many outstanding bluffs, and the land within it appears to be broken into innumerable hills and valleys. Several rivers flow through these hills in deep ravines, whose sides are densely wooded. Except for these, the country is not generally thickly wooded until close to Port St. John's, where the slopes at the back of the coastal range, and parts of St. John's Gates, are forest reserves; these forest reserves extend for several miles north-eastward, and northward of Umzimhlava river, there are dense forests as far as the beginning of Waterfall bluff, though some of the coastal hills are grassy.

The second range is not so conspicuous here, but the third range can be seen when some distance off the coast. When off the southern portion of this stretch of coast, undulating and grassy country, with bush in all the river valleys, can be observed extending many miles inland from the coastal ridge, whilst, northward of Port St. John's and behind the dense forests, the Magwa and Intsoban plateaux, 1,470 and 1,750 feet ($448^{m}1$ and $533^{m}4$) high, respectively, show up bare and outstanding, with a few clumps of trees on the skyline.

This part of the coast is unmistakable, and is rendered more so by the fact that the general aspect of the country changes again at Waterfall bluff (*Lat. 31° 26′ S., Long. 29° 47′ E.*).

Chart 3793.

Coast.—Nthlonyane (Nihlayane) river enters the sea about 3 miles north-eastward of Bashee point; about midway between these points, there is a small patch of sunken rocks lying close offshore.

A sunken reef, over which the sea nearly always breaks, lies about half a mile offshore and parallel with the coast, with its south-western edge about 1¼ miles north-eastward of the mouth of Nthlonyane river. Mpoleni hill, 912 feet ($278^{m}0$) high, lies 3¾ miles north-north-westward of the mouth of Nthlonyane river; it has a speckled appearance and there are a few stunted trees on its summit.

Xora (Ikogha) river enters the sea about 3 miles north-eastward of the mouth of Nthlonyane river; its northern bank is steep and covered with bush, and its southern bank ends in a low point, on which are a number of bungalows.

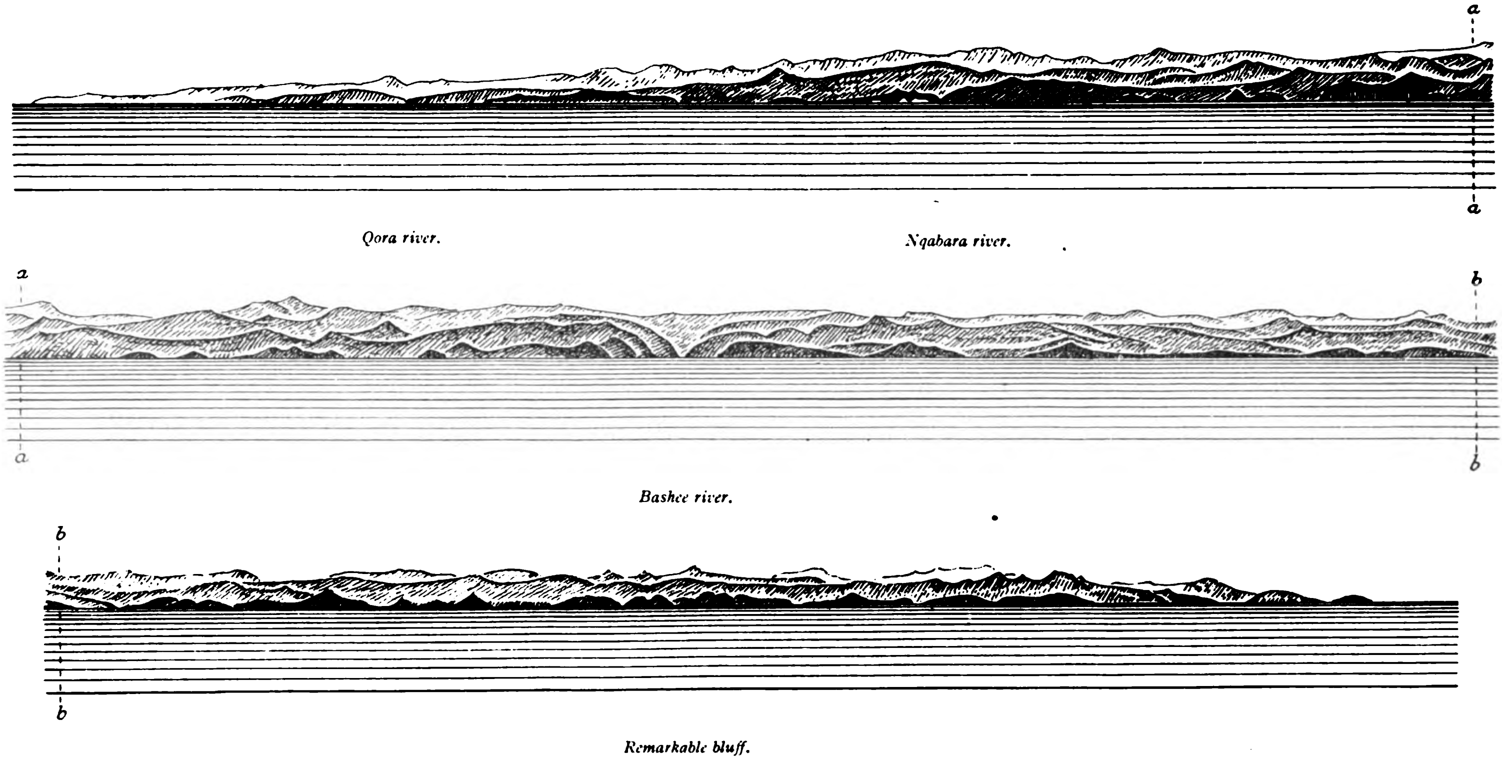
Bulungula river enters the sea about 1¼ miles north-eastward of the mouth of Xora river; close southward of its southern entrance point is a bare, conical hill, 148 feet ($45^{m}1$) high, with a conspicuous white house situated half-way down its eastern slope. The river banks are steep at half a mile within the entrance.

Nqakaqa river enters the sea about 3½ miles north-eastward of the mouth of Bulungula river, and about midway between them is the mouth of Manziamyama river; both Nqakaqa and Manziamyama rivers are short and the banks of the latter are very steep.

Between the mouth of Nqakaqa river and Mncwasa (Mcwasa) point (*Lat. 32° 05′ S., Long. 29° 05′ E.*), about 1¾ miles north-eastward, there is a bay with a sandy beach backed by low coastal hills; Mncwasa river enters the sea in the northern corner of the bay.

Charts 2095, 596, 748a, 2203, 2483.

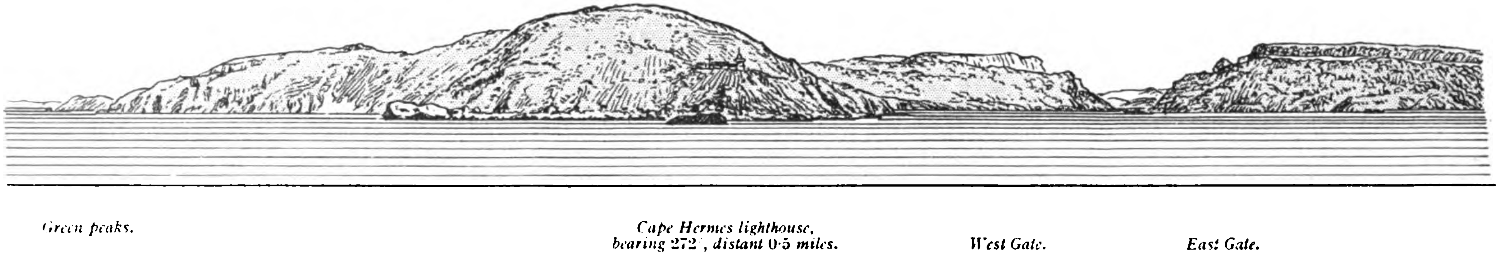
To face page 162.



View, in 3 parts, of the approaches to the Bashee river from 8 miles south-eastward.

(*Original dated* 1868.)

To face page 163.


Green peaks.
Cape Hermes lighthouse, bearing 272°, distant 0·5 miles.
West Gate.
East Gate.

Entrance to Port St. John's.

(*Original dated* 1927.)

Chart 3793.

About 1¼ miles within the coast between Bulungula and Mncwasa rivers, there is a very conspicuous dense forest with two peaks; the south-western peak, 704 feet (214^{m}6) high, is the more conspicuous when approaching from northward, and the north-eastern peak, 656 feet (200^{m}0) high, is more conspicuous when approaching from southward. A store, whose position is indicated by a clump of gum trees, is situated on a bare slope, 613 feet (186^{m}8) high, about 1½ miles north-north-westward of the mouth of the Bulungula river.

Mncwasa point projects considerably from the adjacent coastline, and shows as a very distinct point when viewed from northward or southward; it rises to an elevation of 242 feet (73^{m}8), at a quarter of a mile from its eastern extreme.

The mouth of Mpaka river (*Lat. 32° 02′ S., Long. 29° 07′ E.*) is situated about 2½ miles north-eastward of Mncwasa point; the coast for 1½ miles south-westward of the mouth of Mpaka river consists of steep cliffs, from 250 to 300 feet (76^{m}2 to 91^{m}4) high, which slope steeply to the southern bank of the river.

Hole-in-the-wall.—Two remarkable and prominent rocks lie close to the entrance to Mpaka river. The south-western rock, which is opposite the entrance, is connected to the northern bank by a reef on which the sea breaks; it is 145 feet (44^{m}2) high, and flat-topped, and has a natural archway through its base. The north-eastern rock is larger, being 210 feet (64^{m}0) high, and it has a deep wedge-shaped cleft towards the south-western end of its summit; it is connected to the coast by a ridge about 20 feet (6^{m}1) high. The coast close to Hole-in-the-wall is fringed by sunken rocks, which extend as much as 2 cables offshore.

Coast.—Dangers.—Between Hole-in-the-wall and Whale Rock point, about 8 miles north-eastward, the coast is from 200 to 300 feet (61^{m}0 to 91^{m}4) high, and steep, with cliffs in places, and is broken at intervals by the mouths of several rivers, which generally enter the sea in sandy bays; Umnenga (Bomoo), Tshontini and Mapuzi are the names of three of these rivers, of which the latter enters the sea between cliffs which extend from one mile south-westward to one mile north-eastward of its mouth, and terminate at the southern entrance point of Umtata river.

A rock is shown on the chart about 6 cables southward of the entrance to Umnenga river and about 4 cables offshore.

Close southward of the mouth of Mapuzi river is a conical rock, about 150 feet (45^{m}7) high, which to passing vessels, resembles an island; a ridge of sunken rocks extends from its outer edge for about 3 cables north-eastward.

The western bank of Umtata river is low and marshy from close within its entrance for more than a mile, whence it rises steeply to Mapuzi hill, 786 feet (239^{m}6) high, and double-peaked. The northern entrance point is low and sandy, with a patch of marsh close within it, but it then rises steeply and is covered with thick bush.

Whale Rock point, about 2 miles east-north-eastward of the mouth of Umtata river, is low, and has a sandy beach fringed with a reef; at about one mile westward of its extreme, the land rises to an elevation of 311 feet (94^{m}8). The sandy hills near the extremity of the point are covered with bush, but those within, and especially the slopes to the northern bank of Umtata river, are mostly grassy, with patches of bush.

Charts 2095, 596, 748a, 2203, 2483.

Chart 3793.

but is obscured when bearing less than 274°. The northern bank of Umgazana river is low and marshy for about 2 miles within its entrance, the hills rising gradually northward of the marsh. A sandy beach extends from the mouth of Umgazana river for about 2 miles east-north-eastward to the mouth of Umgazi river; midway between these rivers, the beach is fringed with a reef, which dries. A flat-topped grassy hill, 381 feet (116^{m}1) high, lies close within the coast, about a mile westward of the mouth of Umgazi river; the position of the latter river may be identified by the remarkable white sand at its south-western entrance point.

From the mouth of Umgazi river to the point close under Green Peaks, about three-quarters of a mile eastward, and thence about 4½ miles east-north-eastward to Cape Hermes, the coast is again high, the hills rising steeply from a rocky beach. Sugar Loaf rock, a conical rock, about 25 feet (7^{m}6) high, is connected to the coast about half a mile eastward of Green Peaks by a causeway of sand and rock; it is conspicuous when seen from close inshore, either southward or northward, but merges into the background when at some distance off the coast. There are two shallow bays at about one and 2 miles, respectively, north-eastward of Sugar Loaf rock. The northern bay, known as Second beach, may be identified by the coast at its eastern entrance point, where a portion of the cliff, which appears to have broken away, stands out conspicuously when seen from close inshore, northward of it.

Anchorages.—Landings.—With easterly winds, there is no sheltered anchorage between Rame head and Cape Hermes, owing to the swell running into all the bays.

Whilst engaged on the survey of the coast in 1927, H.M.S.A.S. *Protea* on several occasions anchored at the southern end of Umgazi bay, in from 13 to 16 fathoms (23^{m}8 to 29^{m}3), abreast the sandy patch southward of Black Pudding hill, with Rame head well open of Brazen head. In moderate south-westerly winds, fair shelter was obtained, the vessel remaining at anchor throughout the night on more than one occasion.

Landing on this part of the coast is at all times dangerous, even on the calmest day, and with a north-easterly or easterly swell it is almost impossible. In case of absolute necessity, the following places are suggested at which to make the attempt:—With a north-easterly or easterly swell, Second beach. With a south-westerly wind and no on-shore swell, close northward of Rame head (*Lat. 31° 48′ S., Long.* 29° 21′ *E.*); or, on a very small beach on the northern side of Brazen head; or, at the mouth of Umgazana river; or, on Second beach.

Chart 3794, plan of approaches to Port St. Johns.

Port St. John's and approaches.—The appearance of the land in the vicinity of St. John's river is so remarkable that it is easily identified from seaward. A tableland about 1,200 feet (365^{m}8) high, appears to have been completely cleft in the middle, leaving a wedge-shaped gap through which the river flows into the sea. The upper part of this tableland, known as St. John's Gates, is bare, stratified, sandstone rock, like Table mountain, but at 200 feet (61^{m}0) below the summit, the cliffs are covered with dense forest which extends to the river banks. West Gate is 1,239 feet (377^{m}6) high, and very steep, and East Gate, 1,163 feet (354^{m}5) high, has two distinct terraces

Charts 2095, 596, 748a, 2203, 2483.

Chart 3794, plan of approaches to Port St. Johns.

of tableland, with grass on them. *See* view A on chart 3794, and view facing page 163.

The entrance to the river is situated at the head of Gordon bay, which is entered between Cape Hermes, a round grassy hill, 433 feet ($132^{m}0$) high, and Bluff point, a bluff which rises steeply from the sea to an elevation of 370 feet ($112^{m}8$), about 2¼ miles north-eastward. A few small rocks, of which the highest is 8 feet ($2^{m}4$) high, lie about three-quarters of a cable eastward of Cape Hermes, and Porpoise rock, 59 feet ($18^{m}0$) high, stands close to the eastern entrance point of the river, about three-quarters of a mile northward of Cape Hermes. The coast is rocky for about 3 cables northward of Cape Hermes, whence a sandy beach stretches for about three-quarters of a mile, extending 3 cables within the entrance, and contracting the width of the channel to about half a cable. Between Porpoise rock and Bluff point, about 2 miles east-north-eastward, the coast is rocky, with the exception of a sandy beach about 4 cables in extent, which lies about 1½ miles from Porpoise rock, and is backed by a series of hills, between 200 and 300 feet ($61^{m}0$ to $91^{m}4$) high, close within which the land rises steeply to East Gate.

Entry to Port St. John's is limited by the depths over the bar, which vary constantly, and may be as little as 2 feet ($0^{m}6$), but within the entrance, the river is navigable for vessels of a draught of 7 or 8 feet ($2^{m}1$ or $2^{m}4$), for about 12 miles, and it is tidal for the same distance. From the entrance for about 1½ miles to the Gates, the banks are so steep that small craft can lie alongside them; above the Gates, the river becomes more open and the bottom is very irregular.

Lights.—Signal station.—A light is exhibited at an elevation of 180 feet ($54^{m}9$) from a dark grey octagonal stone tower, 44 feet ($13^{m}4$) in height, situated about half a cable north-westward of the extreme of Cape Hermes. The lighthouse is difficult to distinguish until close in.

There is a signal station at the lighthouse.

A radiobeacon for the use of aircraft stands close to the lighthouse; a *red* obstruction light, visible from seaward, is exhibited from the top of the aerial mast.

Port limits.—Port regulations.—The following are the limits of the port under the control of the Harbour Authorities:—The area embraced between lines drawn one mile 180° from the old signal station at Cape Hermes, and 2·7 miles, 180° from Bluff point, and the parallel of latitude joining the southern extremes of these two lines. Also the whole area of tidal waters of St. John's river and its tributaries.

The General Regulations for the Harbours of the Union of South Africa are in force at Port St. John's (*Lat. 31° 38′ S., Long. 29° 33′ E.*).

Pilotage.—Pilots do not meet vessels outside the bar, but will place leading marks, described below, which, when in line, will guide vessels entering.

Anchorage.—Danger.—Gordon bay affords fair anchorage, but is exposed to winds from north-east to west-south-west. In 1927, H.M.S.A.S. *Protea* anchored on several occasions in from 12 to 13 fathoms ($21^{m}9$ to $23^{m}8$), with Cape Hermes lighthouse bearing 265°, distant about 8 cables, and Porpoise rock bearing 312°, the holding ground was good, the bottom being mud and clay, but elsewhere the bottom appears to be sandy. More shelter might be found

Charts 3793, 2095, 596, 748a, 2203, 2483.

Chart 3794.

high; a conspicuous group of trees is situated on the western extreme of this ridge.

Waterfall bluff.—About 6½ miles north-eastward of the mouth of Umzimhlava river, there is a round green hill, 580 feet (176^m8) high. From thence, Waterfall bluff, a bold cliff, about 300 feet (91^m4) high, extends eastward for over 3 miles, when the cliff ends, and the coast slopes gradually to a low point about three-quarters of a mile north-eastward. There are two main waterfalls on the bluff; the western fall drops sheer to the sea from the top of the bluff, but is not so large or conspicuous as the eastern fall, which drops in terraces. In the dry season, both falls are much reduced in size, but neither was seen quite dry by H.M.S.A.S. *Protea* during her survey of this coast in 1927.

Current.—Caution.—The strength of the Agulhas current setting south-westward along the coast is generally very much weaker close inshore than 2 or 3 miles to seaward. In the vicinity of Port St. John's, however, the strength of the current is felt closer inshore than off any other part of the coast between Bashee point and Waterfall bluff; this is due, apparently, to the contraction of the Agulhas bank in this locality, depths of more than 100 fathoms (182^m9), being found here within 3½ miles of the coast. Observation of the discoloured water from the various rivers will assist mariners in determining if the weak countercurrent experienced at times, within a mile of the coast, is present.

At night, vessels should sound frequently, to ensure not being set into the bight south-westward of Waterfall bluff, when in that vicinity.

Anchorages.—Landings.—There are no sheltered anchorages between Bluff point and Waterfall bluff, but less sea may be expected under Waterfall bluff than elsewhere during north-easterly winds, and small coasting vessels occasionally anchor there when arriving too early for entering Port. St. John's.

During north-easterly winds, landing might be possible under the conspicuous rounded hill at the mouth of Umzimhlava river, and also under the green hill at the western end of Waterfall bluff. From observation, the former place appears to be the better, but both places are dangerous.

During south-westerly winds, in case of necessity the best places for landing are at the mouths of Umgolo and Ntafufu rivers; the mouth of Umgolo river (*Lat. 31° 36′ S., Long. 29° 36′ E.*) is preferable, but boats must not skirt the southern entrance point.

Charts 2095, 596, 748a, 2203, 2483.

CHAPTER V

WATERFALL BLUFF TO PONTA DA BARRA

Charts 3794, 3795.

WATERFALL BLUFF TO CAPE NATAL.—General remarks.—No difficulty should be experienced by vessels in navigating between Waterfall bluff and Cape Natal, about 115 miles north-eastward, as the soundings form an excellent guide, and by keeping in depths of more than 30 fathoms (54^{m}9), vessels will pass not less than 11 cables outside Aliwal shoal, *see* page 176, which is the only outlying danger on this part of the coast. By day, vessels may keep between one and 2 miles offshore between Waterfall bluff and Umzinto bay, about 80 miles north-eastward, and about one mile outside the breakers when northward of Umzinto bay, but at night, unless with considerable local experience, vessels should give the coast a wider berth, and should keep in depths of more than 40 fathoms (73^{m}2) when southward of South Sand bluff lighthouse (*Lat. 31° 20′ S., Long. 29° 58′ E.*). Northward of that lighthouse, the offshore depths increase more gradually than farther southward, and vessels may, with safety, keep in depths of more than 30 fathoms (54^{m}9), when between South Sand bluff lighthouse and Cape Natal.

Current.—Owing to the configuration of the coast northward of Cape Natal, the Agulhas current is deflected from the coastline near that cape and does not approach it again until in the vicinity of Port Shepstone, forming an area within about 3 miles of the coast between Port Shepstone and Cape Natal, in which the current is weak and uncertain, and in which, vessels proceeding northward would gradually lose the current until Aliwal shoal is reached, when its effect would be practically imperceptible. The position of this area is, however, subject to variation ; for example, in January, 1925, within a mile of the coast between East London and Port Shepstone, the current was running with a velocity of from 3 to 4 knots ; between Port Shepstone and Green point, with a velocity of 2 knots, whence it gradually decreased in strength until off Durban, where it was imperceptible.

Aspect.—A complete change in the aspect of the land within the coast occurs northward of Waterfall bluff. The mountain ranges inland can still be seen, but close within the coast, the land appears to rise gradually to a ridge, 1,100 to 1,200 feet (335^{m}3 to 365^{m}8) high, about 2 or 3 miles inland. Except for the river valleys and for a few of the coastal hills, which are covered with bush, the country is mainly bare with a few scattered patches of bush. There are few conspicuous natural features which may assist mariners when at some distance from the coast, but when coasting, the mouths of the rivers may be used.

Charts 2095, 596, 748a, 2203, 2483.

Chart 3794.

Coast.—Between the eastern fall of Waterfall bluff, *see* page 170, and Port Grovenor, about 5 miles north-eastward, the coast is hard and rocky, and has the appearance of a sea-wall, being broken at the mouths of Lupatana (Mpatana) and Mkweni (Umkwani) rivers, which enter the sea about 1¾ and 3 miles, respectively, north-eastward of the eastern fall.

Port Grovenor is a small bight in the coast, at the head of which Lombazi (Ubazi) river enters the sea through a deep ravine, the sides of which are covered with bush. On the southern entrance point of the bight, there is a low sandhill which is prominent from northward, and, about three-quarters of a mile north-eastward of the mouth of Lombazi river is a group of huts and chimneys, and a flagstaff which is noticeable from seaward. Grovenor hill, 1,104 feet ($336^{m}5$) high, flat-topped and bare, is situated about 3 miles north-north-westward of Port Grovenor and is conspicuous, being higher than the adjacent coastal ridge.

Between the mouths of Lombazi and Umsikaba (Umtsikaba) rivers, about 5 miles north-eastward, the coast is rocky and featureless with the exception of a few bushy sandhills about a quarter of a mile within the head of Port Grovenor. The entrance to Umsikaba river forms a considerable indentation in the coastline, and the river is wider than most of the streams on this part of the coast. On its southern bank are two bare green, rounded hills, about 280 and 300 feet ($85^{m}3$ and $91^{m}4$) high, respectively, which are prominent from southward.

Light.—A light (*Lat. 31° 20′ S., Long. 29° 58′ E.*) is exhibited, at an elevation of 268 feet ($81^{m}7$), from a steel tower with a white circular daymark, situated on the hillside about half a mile southward of the mouth of Umsikaba river.

Coast.—South Sand bluff, the northern entrance point of Umsikaba river, is the most prominent mark on the coast between Waterfall bluff and the mouth of Umtamvuna river, about 30 miles north-eastward. It is 273 feet ($83^{m}2$) high, and from southward appears as a dome-shaped hill, topped with bush, and it has a white sand patch, which cannot be seen when bearing less than 270°, covering its lower slopes. Viewed from northward, it resembles a densely-wooded pyramid.

Close westward of South Sand bluff is a group of huts and bungalows, which is the headquarters of the superintendent of a leper reserve; the latter extends for about 4 miles inland between Umsikaba river and Umtentu river, about 5½ miles north-eastward.

There is a patch of bush about half a mile inland on the coastal slope, about 1½ miles north-eastward of South Sand bluff, and another patch lies about half a mile northward of the first patch. Kambati (Mkambati) river enters the sea over three low falls, about 4 miles north-eastward of the mouth of Umsikaba river; the falls are conspicuous in the wet season. About 1¾ miles north-eastward of Kambati falls is the mouth of Umtentu river, a stream of considerable size, which may be identified by Quoin hill, which rises on the southern side of its mouth and is conspicuous. Quoin hill is 200 feet ($61^{m}0$) high, covered with thick bush, and appears very dark in comparison with the adjacent coast. Umtentu river flows into the sea through a deep ravine whose steep sides are dark and bushy.

About 1½ miles north-eastward of the mouth of Umtentu river, the coast bends northward; when viewed from southward, this bend

Charts 2095, 596, 748a, 2203, 2483.

resembles a bluff, with a strip of bushes extending down its outer edge.

Sikombe (Isikota) river enters the sea about 2¼ miles north-eastward of the mouth of Umtentu river ; about 1¼ miles north-eastward of the mouth of the former river is Red hill, a conspicuous rounded hill, 290 feet ($88^{m}4$) high.

Northward of the mouth of Sikombe river there is more sand on the coast, and low, bushy sandhills occur frequently, the principal ones being one mile south-westward and 2 miles north-eastward, respectively, of Red hill ; apart from these the coast between Red hill and the mouth of Umtamvuna river, about 9½ miles north-eastward, has no conspicuous features.

Several rivers enter the sea along this stretch of coast, the principal ones being Kwanyane (Isikombi), Umyameni (Amalulwana) and Umpahlana, which all flow into shallow bights and may easily be identified, and Umzamba, which flows through the hills in deep gorges.

The seaward face of this stretch of coast is thickly covered with bushes in places on the north-eastern portion, and the coastal ridge appears to extend northward from near the mouth of Sikombe river, rising gradually till it terminates in a conspicuous cliff, 1,380 feet ($420^{m}6$) high, overlooking Umtamvuna river about 5 miles within its entrance.

Anchorages.—Landings.—There are no sheltered anchorages between Waterfall bluff and the mouth of Umtamvuna river.

There are no places where landing could be effected during north-easterly winds, but, during south-westerly winds, provided there is not much swell, landing might be effected either at the mouths of Lupatana or Mkweni rivers, or at Port Grovenor.

Umtamvuna river.—Umtamvuna river (*Lat. 31° 05′ S., Long. 30° 12′ E.*) forms the boundary between Cape Province and Natal. The river mouth is always open, but it is not navigable even for small boats. There are conspicuous clumps of trees on either side of its entrance, and close northward, about half a mile inland there is a hill, 290 feet ($88^{m}4$) high, with conspicuous patches of red sand on its slopes ; the high cliffs which form the river banks about 1¼ miles inland are also conspicuous. A disused, whitewashed police post, situated about 2 miles north-westward of the entrance, and overlooking the river at an elevation of 550 feet ($167^{m}6$), and a farmhouse, one mile north-eastward of the police post, at an elevation of 450 feet ($137^{m}2$), are also conspicuous.

When viewed from seaward of the river entrance, the first main ridge of hills, about 4 or 5 miles inland, appears to rise gradually from southward towards the river, which flows through it in a deep gorge, with cliffs about 1,000 feet ($304^{m}8$) high. On the northern side of these cliffs, on what appears to be the highest point of the coastal ridge for many miles, are the two Ikulu Tumuli, which are very conspicuous, both from north-eastward and south-westward. *See* view B on chart 3794.

Coast.—Between the mouths of Umtamvuna and Inkongweni rivers, about 16 miles north-eastward, the coast consists of rocky ledges between which are shallow sandy bays. Sunken ledges extend in places as much as 2 cables offshore, but outside these, there are no-off-lying dangers, and the coast is very steep-to, with the exception

Chart 3794.

Coast.—Between the eastern fall of Waterfall bluff, *see* page 170, and Port Grovenor, about 5 miles north-eastward, the coast is hard and rocky, and has the appearance of a sea-wall, being broken at the mouths of Lupatana (Mpatana) and Mkweni (Umkwani) rivers, which enter the sea about 1¾ and 3 miles, respectively, north-eastward of the eastern fall.

Port Grovenor is a small bight in the coast, at the head of which Lombazi (Ubazi) river enters the sea through a deep ravine, the sides of which are covered with bush. On the southern entrance point of the bight, there is a low sandhill which is prominent from northward, and, about three-quarters of a mile north-eastward of the mouth of Lombazi river is a group of huts and chimneys, and a flagstaff which is noticeable from seaward. Grovenor hill, 1,104 feet ($336^{m}5$) high, flat-topped and bare, is situated about 3 miles north-north-westward of Port Grovenor and is conspicuous, being higher than the adjacent coastal ridge.

Between the mouths of Lombazi and Umsikaba (Umtsikaba) rivers, about 5 miles north-eastward, the coast is rocky and featureless with the exception of a few bushy sandhills about a quarter of a mile within the head of Port Grovenor. The entrance to Umsikaba river forms a considerable indentation in the coastline, and the river is wider than most of the streams on this part of the coast. On its southern bank are two bare green, rounded hills, about 280 and 300 feet ($85^{m}3$ and $91^{m}4$) high, respectively, which are prominent from southward.

Light.—A light (*Lat. 31° 20′ S., Long. 29° 58′ E.*) is exhibited, at an elevation of 268 feet ($81^{m}7$), from a steel tower with a white circular daymark, situated on the hillside about half a mile southward of the mouth of Umsikaba river.

Coast.—South Sand bluff, the northern entrance point of Umsikaba river, is the most prominent mark on the coast between Waterfall bluff and the mouth of Umtamvuna river, about 30 miles north-eastward. It is 273 feet ($83^{m}2$) high, and from southward appears as a dome-shaped hill, topped with bush, and it has a white sand patch, which cannot be seen when bearing less than 270°, covering its lower slopes. Viewed from northward, it resembles a densely-wooded pyramid.

Close westward of South Sand bluff is a group of huts and bungalows, which is the headquarters of the superintendent of a leper reserve; the latter extends for about 4 miles inland between Umsikaba river and Umtentu river, about 5½ miles north-eastward.

There is a patch of bush about half a mile inland on the coastal slope, about 1½ miles north-eastward of South Sand bluff, and another patch lies about half a mile northward of the first patch. Kambati (Mkambati) river enters the sea over three low falls, about 4 miles north-eastward of the mouth of Umsikaba river; the falls are conspicuous in the wet season. About 1¾ miles north-eastward of Kambati falls is the mouth of Umtentu river, a stream of considerable size, which may be identified by Quoin hill, which rises on the southern side of its mouth and is conspicuous. Quoin hill is 200 feet ($61^{m}0$) high, covered with thick bush, and appears very dark in comparison with the adjacent coast. Umtentu river flows into the sea through a deep ravine whose steep sides are dark and bushy.

About 1½ miles north-eastward of the mouth of Umtentu river, the coast bends northward; when viewed from southward, this bend

Charts 2095, 596, 748a, 2203, 2483.

Chart 3794.

resembles a bluff, with a strip of bushes extending down its outer edge.

Sikombe (Isikota) river enters the sea about 2¼ miles north-eastward of the mouth of Umtentu river; about 1¼ miles north-eastward of the mouth of the former river is Red hill, a conspicuous rounded hill, 290 feet (88m4) high.

Northward of the mouth of Sikombe river there is more sand on the coast, and low, bushy sandhills occur frequently, the principal ones being one mile south-westward and 2 miles north-eastward, respectively, of Red hill; apart from these the coast between Red hill and the mouth of Umtamvuna river, about 9½ miles north-eastward, has no conspicuous features.

Several rivers enter the sea along this stretch of coast, the principal ones being Kwanyane (Isikombi), Umyameni (Amalulwana) and Umpahlana, which all flow into shallow bights and may easily be identified, and Umzamba, which flows through the hills in deep gorges.

The seaward face of this stretch of coast is thickly covered with bushes in places on the north-eastern portion, and the coastal ridge appears to extend northward from near the mouth of Sikombe river, rising gradually till it terminates in a conspicuous cliff, 1,380 feet (420m6) high, overlooking Umtamvuna river about 5 miles within its entrance.

Anchorages.—Landings.—There are no sheltered anchorages between Waterfall bluff and the mouth of Umtamvuna river.

There are no places where landing could be effected during north-easterly winds, but, during south-westerly winds, provided there is not much swell, landing might be effected either at the mouths of Lupatana or Mkweni rivers, or at Port Grovenor.

Umtamvuna river.—Umtamvuna river (*Lat. 31° 05′ S., Long. 30° 12′ E.*) forms the boundary between Cape Province and Natal. The river mouth is always open, but it is not navigable even for small boats. There are conspicuous clumps of trees on either side of its entrance, and close northward, about half a mile inland there is a hill, 290 feet (88m4) high, with conspicuous patches of red sand on its slopes; the high cliffs which form the river banks about 1¼ miles inland are also conspicuous. A disused, whitewashed police post, situated about 2 miles north-westward of the entrance, and overlooking the river at an elevation of 550 feet (167m6), and a farmhouse, one mile north-eastward of the police post, at an elevation of 450 feet (137m2), are also conspicuous.

When viewed from seaward of the river entrance, the first main ridge of hills, about 4 or 5 miles inland, appears to rise gradually from southward towards the river, which flows through it in a deep gorge, with cliffs about 1,000 feet (304m8) high. On the northern side of these cliffs, on what appears to be the highest point of the coastal ridge for many miles, are the two Ikulu Tumuli, which are very conspicuous, both from north-eastward and south-westward. *See* view B on chart 3794.

Coast.—Between the mouths of Umtamvuna and Inkongweni rivers, about 16 miles north-eastward, the coast consists of rocky ledges between which are shallow sandy bays. Sunken ledges extend in places as much as 2 cables offshore, but outside these, there are no-off-lying dangers, and the coast is very steep-to, with the exception

Charts 2095, 596, 748a, 2483.

Chart 3794.

of off the mouths of Umpenjati and Umhlengeni rivers, about 8 and 10 miles, respectively, north-eastward of the mouth of Umtamvuna river, where depths of less than 5 fathoms (9^{m}1), extend 7 and 5 cables, respectively, offshore.

North Sand bluff, an isolated, conical hill, 225 feet (68^{m}6) high, covered with dark bush, and situated about 2½ miles north-eastward of the mouth of Umtamvuna river, is prominent, especially when seen from north-eastward.

Several rivers enter the sea along this stretch of coast, but, except after heavy rains, their mouths are all closed by sand. There are a number of farms along the coast, and, in the valley of Umhlengeni river and a short distance within its mouth, is a police post which is visible from seaward between the bearings of 250° and 351°, although it may be obscured by trees between the bearings of 303° and 331°.

Charts 3794, 3795.

Between the mouths of Inkongweni and Umzimkulu rivers, about 9 miles north-eastward, several rivers enter the sea, of which Izotsha river, whose mouth is about 5½ miles north-eastward of the mouth of Inkongweni river, is the largest. There are also several villages and seaside resorts, which may be identified from seaward; of these, the principal are: Margate, on the southern bank of the mouth of Inkonweni river, Uvongo (Evunga), on the northern side of the mouth of Uvongo (Evunga) river, about 2½ miles north-eastward of Margate, and Beach Terminus (*Lat. 30° 47′ S., Long. 30° 25′ E.*), on the southern side of the mouth of Izotsha river. At Beach Terminus, the railway which follows the coast from Durban to this position, turns inland.

Evungo (Evunga) cliff, 1,800 feet (548^{m}6) high, is a whale-shaped mountain, lying north-eastward and south-westward, with its north-eastern end apparently terminating in a bold cliff. It is situated about 7 miles north-westward of the mouth of Inkongweni river, and is conspicuous when seen from southward, but becomes difficult to distinguish when seen from northward of east. *See* view B on chart 3794.

Chart 3794.

About 4 miles off the coast, between the mouths of Uvongo and Izotsha rivers, are Protea banks, over which there is a least depth of 15 fathoms (27^{m}4).

Port Shepstone. — Light. — Signal station. — Life-saving. — Port Shepstone, the largest village on this part of the coast, is situated on the southern bank near the mouth of Umzimkulu river; North Shepstone, a village on the opposite bank, is smaller. The southern entrance point of the river is low, but rises steeply to 230 feet (70^{m}1) high, half a mile within the point; the northern bank appears to be steeper. The convent, a large, red building, about 3½ cables westward of the southern entrance point, is conspicuous from northward and eastward, and, although it is obscured from southward, two trees near it are conspicuous when viewed from this direction.

Entry to Umzimkulu river is not possible for sea-going vessels of any description, as its mouth is at all times completely closed; landing is always dangerous, although in very calm weather, small fishing boats occasionally put out from a sand spit. A breakwater was commenced on the southern bank, but was in ruins in 1925.

A light is exhibited, at an elevation of 78 feet (23^{m}8), from an iron tower, painted in black and white chequers, with a white lantern 25 feet

Chart 3794.

($7^{m}6$) in height, situated on the southern entrance point. The lighthouse is not conspicuous.

A signal station with a flagstaff is situated close to the lighthouse; communication by flag signalling is discontinued on Sundays.

A line-throwing apparatus is kept near the lighthouse.

Chart 3795.

Coast.—Between Port Shepstone and Umzinto bay, about 27 miles north-eastward, several rivers enter the sea but all have their mouths completely closed by sand. The coast presents few conspicuous natural features, but the various villages may be readily identified. The following are the principal villages between North Shepstone and the mouth of Umzumbi river, about 8½ miles north-eastward: Umtentweni, Sea Park, Southport, Sunwich port, Melville and Umzumbi; close north-eastward of Umtentweni, which adjoins North Shepstone, there is an hotel with several rondavels, or circular huts, which are noticeable; Southport, the most prominent village, consists of rondavels built on the arc of a circle with a single house fronting them, and, about half a mile southward of Umzumbi village, there is a conspicuous red brick convent, situated on a hill, 200 feet ($61^{m}0$) high.

Two red hills, each about 330 feet ($100^{m}6$) high, are situated about 3 and 4½ miles, respectively, north-north-eastward of the mouth of Umzumbi river. The former is in the shape of a ridge, and the latter is dome-shaped.

Umtwalumi river (*Lat. 30° 29′ S., Long. 30° 38′ E.*) enters the sea between steep banks, about 8½ miles north-eastward of the mouth of Umzumbi river; it is the most noticeable river on this part of the coast, its southern entrance point appearing as a bluff on which is a long, low hotel which is conspicuous, but is obscured from southward when close inshore.

At Isezela, about 5 miles north-eastward of the mouth of Umtwalumi river, there is a sugar mill with two square chimneys which are conspicuous; during the crushing season, from May to December, the glare from the mill can generally be seen at night, and forms a useful mark when approaching Aliwal shoal. Umdoni (Indoni) house, situated about 1½ miles north-eastward of Isezela sugar mill, is conspicuous, being the only white house with a red gabled roof in the vicinity.

The mouth of Umzinto river is about 3 miles north-north-eastward of Isezela sugar mill; about 2 miles north-north-eastward of the mouth of Umzinto river there is a whaling station, which is obscured from southward, but is conspicuous when viewed from elsewhere.

About 4 miles north-north-eastward of the whaling station is the mouth of Umpambinyoni river, on the southern bank of which is the village of Scottsburg; the village is conspicuous, being the largest between this river and Port Shepstone, and at night, care is necessary to avoid confusing the glare from this village with the glare from Isezela sugar mill. In fine weather, small fishing boats from Scottsburg may be found in the vicinity of Aliwal shoal, but landing at Scottsburg is always dangerous, and is only possible occasionally.

Green point is situated about 2 miles north-north-eastward of the mouth of Umpambinyoni river; about 6 cables within its extreme, there is a wooded hill, 360 feet ($109^{m}7$) high, which is darker than the adjacent country.

The mouths of Amahlongwana and Umkomaas rivers lie 1¾ and

Charts 2095, 596, 748a, 2483.

Chart 3795.

3¼ miles, respectively, northward of Green point; the latter river is the only one between Port Shepstone and Durban whose mouth is not entirely closed by sand, but it is not navigable even by boats on account of the constant surf. The village of Umkomaas, in which there are two conspicuous hotels, is situated on the slope overhanging the southern bank of Umkomaas river.

Lights.—Beacons.—A light is exhibited, at an elevation of 282 feet ($85^{m}9$), from a cylindrical tower, 68 feet ($20^{m}7$) in height, painted with red and white bands, situated on Green point. An auxiliary light is exhibited, at an elevation of 248 feet ($75^{m}6$), from the same tower. Although the lighthouse can be seen from a good distance in clear weather, burning of sugar cane and grass takes place at times, and may cause a haze over the lighthouse and adjacent coast.

Three beacons have been erected on this part of the coast to assist the mariner in determining the position when passing Aliwal shoal. The southern beacon consists of a mast, surmounted by a disc, the upper half of which is painted red, and the lower half white, and stands, at an elevation of 159 feet ($48^{m}5$), on a hill near the coast at Scottsburg.

The middle beacon consists of a pyramid, surmounted by a cask, and is situated about 2½ cables south-eastward of Green point lighthouse, and, when in line with the lighthouse, bearing 285°, it indicates the position of Aliwal shoal.

The northern beacon consists of a mast, surmounted by a white triangle, and stands, at an elevation of 170 feet ($51^{m}8$), on the northern bank of Amahlongwana river, about 2 miles northward of Green point (*Lat. 30° 15′ S., Long. 30° 47′ E.*).

Bank.—Off-lying danger.—The Ridge, a bank over which the depths vary between 7 and 10 fathoms ($12^{m}8$ and $18^{m}3$), extends seaward from the mouth of Umpambinyoni river nearly to Aliwal shoal.

Aliwal shoal, over which there is a least depth of 9 feet ($2^{m}7$), is situated about 2¾ miles from the coast east-south-eastward of Green point. The *red* sector of Green point light covers Aliwal shoal between the bearings of 268° and 298°.

Current.—Aliwal shoal being within the area in which the current is weak and uncertain, *see* page **171**, no current of appreciable strength is usually experienced. A weak current, setting south-westward across the shoal, may be encountered, and occasionally a counter current may be found setting north-eastward close inshore, but it is only in exceptional circumstances that any but weak currents are experienced within 2 miles of this part of the coast.

Directions.—By day, the passage inside Aliwal shoal presents no difficulties. *See* view B on chart 3795.

At night, unless with local knowledge, vessels are recommended to pass outside Aliwal shoal, as the glare from Green point light makes it very difficult to judge the distance from the breakers, and soundings are of little value as a check to a vessel's position when passing inside the shoal.

By keeping in soundings of more than 30 fathoms ($54^{m}9$), vessels will have a clear passage at not less than one mile outside the shoal.

Coast. — Bank. — Light. — Radiobeacon. — Umgababa, Umzimbazi and Illovo (Ilovo) rivers enter the sea about 3, 5 and 6 miles, respectively, north-north-eastward of the mouth of Umkomaas

Charts 3796, 2095, 596, 748a, 2483.

Chart 3795.

river ; close northward of the entrance to each of the two former rivers, there is a conspicuous hotel.

Illovo spit, a bank on which the depths vary between 7 and 10 fathoms (12^{m}8 and 18^{m}3), extends for about 2 miles from the coast between the mouths of Umgababa and Illovo rivers.

About 2½ miles northward of the mouth of Illovo river are the adjoining villages of Warner Beach and Doonside, the houses of which are very scattered ; a very conspicuous hotel stands on a hill, 330 feet (100^{m}6) high, close within Doonside village.

About one mile northward of Doonside is the mouth of Amanzimtoti river, on the slopes on the northern side of which is Amanzimtoti village, whence the coast for 4 miles northward is a high ridge, which terminates in a conspicuous bluff, 360 feet (109^{m}7) high, known as False bluff, from its resemblance to Cape Natal.

Isipingo Beach, the northern of the coastal villages, is about one mile northward of False bluff, and close southward of the mouth of Isipingo (Umlazi) river ; between the village and the river there is a hill 215 feet (65^{m}5) high, which has a broad, sand patch extending from its base nearly to its summit. This patch is very conspicuous, and is the only elevated sand visible northward of Port Shepstone.

From the mouth of Isipingo river to Cape Natal (*Lat. 29° 52′ S., Long. 31° 04′ E.*), about 9½ miles north-eastward, the coast is steep-to and presents no indentations, the land within being high and wooded. About 2 miles north-eastward of the mouth of Isipingo river is a conspicuous " V " shaped cutting through the coastal hills, through which Umlazi river has been diverted to the sea. At half a mile and 1½ miles respectively, southward of Cape Natal, there is a whaling station.

A light, known as Cooper light, is exhibited at an elevation of 438 feet (133^{m}5) from a white, concrete tower 70 feet (21^{m}3) in height, about 5 miles south-westward of Cape Natal.

A radiobeacon is established close to the above light.

Dumping ground.—Caution.—A disused ammunition dumping ground, about 6 miles in extent, lies with its centre in a position about 7 miles south-eastward of Cape Natal. Anchoring or fishing within this area is not advisable.

Charts 643, 3795.

Cape Natal.—Lights.—Signal station.—Life-saving.—Cape Natal, also known as the Bluff, is a high, wooded peninsula which terminates in a remarkable bluff, 195 feet (59^{m}4) high ; it is readily identified, as the coast northward of the cape recedes and is low for several miles. Cave rock, 20 feet (6^{m}1) high, lies close off its eastern side.

A light is exhibited, at an elevation of 224 feet (68^{m}3) from the roof of a building 15 feet (4^{m}6) in height, situated near the extreme of Cape Natal.

Thirteen obstruction lights, visible from seaward, are exhibited near the coast between False Bluff and Cape Natal.

A signal station, at which day and night watch is kept, and which is connected to the general telephone system, is situated near the lighthouse.

A line-throwing apparatus is kept at the foot of the bluff, below the lighthouse.

Charts 2095, 596, 748a, 2483.

Charts 577, 3795, 3796.

DURBAN HARBOUR AND APPROACHES.—Off-lying danger.—Natal road is entered between Cape Natal and the mouth of Umgeni river, about 3½ miles north-north-westward. Immediately westward of Cape Natal is the entrance to Durban harbour, northward of which the coast is low and flat as far as the mouth of Umgeni river, the land within being also low and flat for upwards of a mile, whence it rises gradually to the Berea range of hills, between 400 and 500 feet (121^m9 and 152^m4) high. The town of Durban is situated on the coastal plain and extends northward to the slopes of the Berea hills and southward to the Point, a low tongue of land on the northern side of the harbour entrance. The grain elevator at Congella, about 3 miles westward of the entrance, is prominent.

The entrance is sheltered by two breakwaters, of which South breakwater projects from Cape Natal and North pier projects from the Point. Within the entrance the harbour opens out and in it are large deep areas and wharfage for ocean-going shipping.

A shoal known as the Dump, over which there is a least depth of 52 feet (15^m8), is situated about 1½ miles east-north-eastward of Cape Natal; this shoal was originally formed by the dumping of dredgings which is now done elsewhere.

In 1926, a patch of foul ground, over which there was a depth of 10 fathoms (18^m3), was reported to lie about 2½ miles eastward of the mouth of Umgeni river.

With the exception of the above, Natal road is free from dangers in its approach, and the depths decrease fairly regularly, depths of 10 fathoms (18^m3) being found between one and 2 miles offshore.

Chart 643.

Lights.—Light-beacon.—A light is exhibited, at an elevation of 28 feet (8^m5), from a black, iron column, 22 feet (6^m7) in height, situated on the head of the South breakwater.

A light is exhibited, at an elevation of 24 feet (7^m3), from a black, iron column, 18 feet (5^m5) high, situated on the head of North pier (*Lat. 29° 52′ S., Long. 31° 04′ E.*).

Two lights, disposed vertically, are shown from each of two caissons, situated about 4½ cables south-westward of North Pier light-structure and about 1¾ cables north-westward of Cape Natal lighthouse respectively. Two unlighted caissons are situated about 2½ cables westward and 2½ cables north-westward of Cape Natal lighthouse.

Leading lights are shown from positions within the entrance. The front light is exhibited, at an elevation of 71 feet (21^m6), from a position near the edge of a drying bank, about one mile south-westward of Cape Natal lighthouse. The rear light is exhibited, at an elevation of 110 feet (33^m5), from a position about 6 cables south-westward of the front light.

A light is exhibited from the south-eastern corner of "**T**" jetty, about 9¼ cables north-westward of the front leading light.

Chart 577.

A light, known as Anchorage beacon light, is exhibited at an elevation of 97 feet (29^m6), from a black, steel, framework tower with yellow bands, 40 feet (12^m2) in height, situated on Snell Parade, nearly 2¼ miles north-westward of Cape Natal lighthouse.

Chart 643.

Lights for the use of aircraft are exhibited as follows:—

Chart 643.

Three lights about 2½, 10 and 18 cables south-westward of Cape Natal lighthouse (*Lat. 29° 52′ S., Long. 31° 04′ E.*);

A light from each of two radio masts, about 2¼ miles north-westward of Cape Natal lighthouse;

Two lights on cranes on South breakwater;

Two lights on North pier, one on a mast near the sewer vent, the other on a crane near the head of the pier;

A light on a water tank, situated on the Point about half a cable north-westward of the western end of Old Repair quay (page 182);

Two lights near the Port office;

Four lights on telephone poles, about 4¼ cables west-south-westward of Island View wharf (page 183).

Two lights on a building, situated about 1¾ cables south-south-eastward of the graving dock entrance at Congella (page 183);

Two lights on a grain elevator at Congella.

In addition, many other tall erections and buildings are similarly lighted.

Anchorage.—Spoil ground.—In fine weather the sea usually breaks in depths of less than 5 fathoms ($9^{m}1$), but in bad weather, breakers extend to depths of 7 and 8 fathoms ($12^{m}8$ and $14^{m}6$), and vessels should therefore anchor in depths of not less than 10 fathoms ($18^{m}3$). The best berth is with Cape Natal lighthouse bearing 198° and Anchorage beacon bearing 254°, in 12 fathoms ($21^{m}9$), good holding ground, but there is no shelter during southerly and easterly winds, when a heavy swell always sets in along the coast; in a more southerly position, the out-going tidal stream swings vessels broadside on to the swell, causing them to roll heavily.

Gales or strong winds may be blowing from south-eastward, at from 50 to 100 miles off the coast, and may be deflected to east-north-east or north-east on reaching the land, and it is the swell, caused by these distant south-easterly winds, which, catching vessels, at anchor in Natal road and swung head on to the local wind, on the starboard bow, causes them to ride uneasily, and, if they part their cables, to cant towards the coast.

Vessels arriving during bad weather should signal for instructions before anchoring.

The area inshore of an imaginary line drawn 000° from the head of North pier, is used as a spoil ground. Vessels should keep well outside this area, the eastern limit of which is indicated by a pecked line on the chart.

Tidal streams.—In Natal road, the tidal stream sets northward during the rising tide and southward during the falling tide. Off the ends of the breakwaters a countercurrent, setting southward during the rising tide and northward during the falling tide, is often experienced; the position of the dividing line between the two opposing currents varies and may be met close to the breakwaters. Great care is necessary when approaching the entrance in a heavy ship. In the entrance channel, the in-going tidal stream has a maximum velocity at springs of about 2½ knots, and the out-going tidal stream of about 3½ knots. At neaps the in-going stream rises to about half a knot and the out-going to about 1½ knots.

Directions.—As the depths in Natal road decrease regularly, the anchorage may safely be approached by constantly sounding;

Chart 643.

southward of Cape Natal (*Lat.* 29° 52′ *S.*, *Long.* 31° 04′ *E.*), the bottom is mainly sand, whilst northward of the cape, fine black sand is found.

Vessels from south-westward, having passed Aliwal shoal, *see* directions on page 176, may steer for Cape Natal lighthouse, bearing 020° or less, until abreast of the mouth of Umlazi river; when northward of that river, vessels should keep about one mile from the coast until Cape Natal lighthouse bears about 272°, when course may be shaped for the anchorage.

If entering the harbour, the two leading light-structures in line, bearing 217°, lead, nearly in mid-channel, through the entrance. *See* view A on chart 3795.

Vessels from north-eastward should avoid the foul ground reported about 2½ miles eastward of the mouth of Umgeni river.

Signal station.—Signals.—Dredging signals.—A signal station, at which day watch only is kept, is situated on top of the Port office (*Lat.* 29° 52′ *S.*, *Long.* 31° 03′ *E.*) at the Point, about half a mile westward of Cape Natal lighthouse; it is connected to the general telephone system.

The following signals are displayed at the Bluff and at the Point signal stations:—

By day.—

A black cone, point downwards, half-way up to the yard-arm	Bar dangerous.
A similar cone at the yard-arm	Bar impassable.
A black ball at the gaff . .	Keep clear of an in-coming vessel.
Two black balls, displayed vertically at the gaff . . .	Keep clear of an out-going vessel.

Navigational signals are displayed at the gaff.

At night.—

Two *green* lights, disposed vertically, shown at the Bluff, and one *green* light, shown at the Point	Keep clear of an in-coming vessel.
Two *red* lights, disposed vertically, shown at the Bluff, and one *red* light shown at the Point .	Keep clear of an out-going vessel.
One *red* light, shown at the Bluff	Bar impassable.

When aircraft are expected to alight or take off in the harbour, the following signals are shown from the western arm of Bluff signal station and from the Point signal station:—

By day.—A black diamond.

At night.—A *blue* light, exhibited from the Bluff signal station only.

Note.—While these signals are shown, vessels outside the harbour entrance must remain there and vessels inside must not approach the inner end of the entrance channel or move about therein.

The area to be kept clear will be indicated, by day, by a control launch or launches, which will display N flag of the International Code of Signals at the stern, and masters of vessels must conform to the instructions given by these launches.

At night, the area to be kept clear will be defined by a line of floating landing lights indicating the line of approach or take-off and will be kept clear by a launch or launches, each exhibiting a *blue* light at the stern.

Charts 3795, 3796, 2095, 596, 748a, 2483.

Chart 643.

The depths in the entrance channel are maintained by dredging, and when dredgers are at work or in a position for working, they will display the following signals to indicate that they cannot get out of the way, and that the speed of vessels must be reduced to ensure passing the dredger without causing damage.

By day.—Two black balls displayed vertically at one yard-arm and one black ball at the other yard-arm.

At night.—*Red* lights are shown instead of black balls.

Vessels should pass on that side on which the two balls or lights are shown. Should the dredger show two black balls at each yard-arm, vessels may pass on either side.

Pilotage.—Pilotage is compulsory for merchant vessels entering, leaving or shifting berth in the harbour within the entrance and in the approaches thereto, and no vessel should attempt to cross the bar without a pilot. Masters of vessels, not holding a pilotage exemption certificate from the Port Captain, who enter without a pilot on board, render themselves liable to a fine or imprisonment, or both.

Pilots board vessels on arrival in Natal road. In south-westerly winds, vessels may approach to a safe distance from the end of the breakwaters to pick up a pilot. In northerly to easterly winds the breakwaters should not be approached within a distance of 1½ miles.

Vessels arriving by day are generally taken into harbour at once, but, except under special circumstances or in the case of emergency, vessels are not taken into harbour at night.

Chart 577.

Port limits.—Port regulations.—The following are the limits of the port under the control of the Harbour Authorities and are indicated by pecked lines on chart 577 :—The area contained between the mouth of Umgeni river (*Lat.* 29° *49′ S., Long.* 31° *02′ E.*) and a point on the southern side of the Bluff, 2 miles from its northern extremity, from high water mark for a distance of 3 miles seaward. Also all harbour works and dock lands vested in the Government of the Union of South Africa.

The General Regulations for the Harbours of the Union of South Africa are in force at Durban ; a copy of these regulations should be obtained on arrival, as there are special regulations at Durban for vessels carrying explosives and for vessels coaling.

Public Traffic Orders are also in force, a copy of which should be obtained.

Chart 643.

Harbour entrance.—Depths.—Buoyage.—The entrance lies between South breakwater, and North pier, which project north-eastward from Cape Natal and from the Point, respectively ; it has a navigable width of nearly 500 feet ($152^{m}4$).

The bar is seldom impassable, but is occasionally dangerous. In 1953, a least depth of 42 feet ($12^{m}8$) was maintained in the entrance channel.

Within the entrance, there are two main navigable channels, Island View channel, leading to Island View wharf, at the Bluff on the southern side of the harbour, and Maydon channel, leading westward of the wharves at the Point to Maydon wharf, the turning basin and the graving dock, all on the western side of the harbour. In 1953, there was a least depth of 35 feet ($10^{m}7$) in Island View channel, 40 feet

Charts 3795, 3796, 2095, 596, 597, 748a, 2483.

Chart 643.

(12^{m}2) in Maydon channel, 40 feet (12^{m}2) in the turning basin and also in the graving dock basin.

A light-buoy, exhibiting *two fixed red* lights disposed vertically, is moored on the south-eastern side of the entrance channel, about half a mile within the head of North pier.

A light-buoy, exhibiting a *white flashing* light *every second*, is moored on the north-western side of the entrance channel, about 5¼ cables within the head of North pier.

A light-buoy, painted red and exhibiting a *white flashing* light *every second*, is moored at the entrance to Island View channel and about half a cable southward of the south-eastern corner of the wharf projecting eastward from Salisbury island.

Maydon channel is marked by lighted and unlighted buoys; Island View channel is marked on its northern side by black conical buoys.

Congella channel, a boat channel across the bank southward of Maydon channel, is marked by beacons on its north-eastern side.

There are several sets of moorings in the harbour at which vessels of a draught of 35 feet (10^{m}7), can be accommodated; there are also numerous other moorings for smaller vessels of between 9 and 24 feet (2^{m}7 and 7^{m}3) draught.

Wharfage.—Depths.—In 1949, the wharfage was as follows:—

The Point.—Old Repair quay (*Lat.* 29° 52′ *S.*, *Long.* 31° 03′ *E.*) is situated on the north-western side of the entrance, close south-westward of the root of North pier; it is 600 feet (182^{m}9) in length, with a depth alongside of 22 feet (6^{m}7).

A quay commences about one cable south-westward of Old Repair quay and extends westward and north-westward for a total length of 5,715 feet (1,741^{m}9). The depths alongside are greatest at its outer or eastern end and decrease as follows:—38½ feet (11^{m}7) for a length of 710 feet (216^{m}4); 34½ feet (10^{m}5) for 1,080 feet (329^{m}2); 30 feet (9^{m}1) for 707 feet (215^{m}5); 27 feet (8^{m}2) for 903 feet (275^{m}2); 23 feet (7^{m}0) for 2,295 feet (699^{m}5).

At the south-eastern end of the quay, a jetty extends eastward for a distance of 440 feet (134^{m}1); the western part, 234 feet (71^{m}3) in length, in 1949, had a depth alongside of 38½ feet (11^{m}7), and the eastern part 32 feet (9^{m}8) for 206 feet (62^{m}8). This is used as a berth for tugs.

At the north-western end of the above-mentioned quay, " **T** " jetty extends about 3½ cables south-south-westward, with depths of from 36 to 40 feet (11^{m}0 to 12^{m}2) alongside on its eastern and western sides, and of 40 feet (12^{m}2) alongside its head.

A quay extends 1,239 feet (377^{m}6) north-westward from the root of " **T** " jetty with a depth of 36 feet (11^{m}0) alongside.

The Bluff.—Bluff quay, with five numbered coaling berths, extends for 2,436 feet (773^{m}0), south-westward from a position about half a mile south-westward of the root of South breakwater. It has a depth alongside of 35 feet (10^{m}7) for a length of 780 feet (237^{m}7); 30 feet (9^{m}1) alongside for 590 feet (179^{m}8); 34 feet (10^{m}4) alongside for about 580 feet (176^{m}8); 30 feet (9^{m}1) alongside for about 486 feet (148^{m}1). Close south-westward of this point there are depths alongside of from 20 to 12 feet (6^{m}1 to 3^{m}7) for 207 feet (63^{m}1), where coal punts are loaded by means of a small conveyor belt. For the next 100 feet

Charts 577, 3795, 3796, 2095, 596, 748a, 2483.

Chart 643.

($30^{m}5$) known as the Timber wharf, there is a depth of 25 feet and this wharf is used for coaling small craft.

South westward of Bluff quay (*Lat. 29° 53′ S., Long. 31° 03′ E.*) are Island View dolphin berths, numbered 1 to 4; No. 1 berth, the north-easternmost had, in 1949, a depth of 42 feet ($12^{m}8$) alongside, and is the deepest berth in the harbour; Nos. 2, 3, and 4 berths have a depth of 35 feet ($10^{m}7$) alongside.

At these berths fresh water and oil fuel may be obtained.

Island View.—Island View wharf, which is used for discharge of oil from, or the supply of oil to, vessels, extends for about 1,500 feet ($457^{m}2$) south-westward from a position on the southern side of Island View channel, close south-westward of Island View dolphin berth No. 4. It has a depth alongside of 36 feet ($11^{m}0$) for a length of 1,000 feet ($304^{m}8$) at its seaward end, and of 35 feet ($10^{m}7$) alongside for 500 feet ($152^{m}4$) at its inshore end.

Island View channel and wharves are to be extended south-westward, as indicated by pecked lines on the chart.

Salisbury island.—At the eastern end of Salisbury island a wharf about 1,400 feet ($426^{m}7$) in length, forms the northern side of Island View channel. Depths of from 23 to 30 feet ($7^{m}0$ to $9^{m}1$) exist alongside the northern side of this wharf, and are indicated on the chart; the southern side is shoal. At the south-western corner of the northern side of the wharf there is a flagstaff 80 feet ($24^{m}4$) high.

Dock jetty, southward of which there are some pontoons, lies less than one cable northward of the above wharf, and another jetty, also projecting north-eastward, lies northward of Dock jetty.

The wharf and both jetties are connected to the railway system, the rail tracks running southward over a causeway which connects the western end of Salisbury island with the mainland.

Congella.—Fish wharf extends for 500 feet ($152^{m}4$) westward, from a position about 2 cables northward of the northern entrance to Congella channel; it has a depth alongside of 20 feet ($6^{m}1$).

Maydon wharf extends about 10½ cables south-westward from a position close westward of the Fish wharf, and has eleven numbered berths; in 1949, there were depths of from 25 to 32½ feet ($7^{m}6$ to $9^{m}9$) alongside berths Nos. 1 to 10; No. 11, a dolphin berth, had a depth of 35 feet ($10^{m}7$).

Graving dock quay wall, with berths Nos. 12 to 15, extends westward from the south-western end of Maydon wharf to the entrance of the graving dock; in 1949, there were depths at these berths of from 25 to 32½ feet ($7^{m}6$ to $9^{m}9$).

Southward of the entrance to the graving dock are New Repair quay, a floating dock and the Marine airport.

Port facilities.—All the quays and wharves are connected to the general railway system and, with the exception of Island View and Maydon wharves, are equipped with electric cranes. Most of the cranes are from 3 to 10 tons lifting capacity, but there is an 80-ton crane at the south-western angle of the quay at the Point (*Lat. 29° 52′ S., Long. 31° 03′ E.*). The graving dock is equipped with a 25-ton crane, one 10-ton, two 5-ton and one 3-ton cranes, and there is also a 25-ton floating crane.

A few lighters are available.

Supplies.—Coal is stocked in large quantities and can be taken in

Charts 577, 3795, 3796, 2095, 596, 748a, 2483.

Chart 643.

alongside Bluff quay by means of electrical appliances, capable of coaling at the rate of up to 1,400 tons per hour, or alongside the quay at the Point, in baskets, at the rate of 2,000 tons per day.

Fuel oil is stocked in large quantities. Vessels can bunker alongside Island View wharf, at a rate of supply of 150 tons per hour, by pipe line, also at The Point quay, dolphin berths and at " **T** " jetty berths. A large supply of diesel oil is available.

Water is laid on to the quays and can be supplied to vessels at moorings or in the roadstead by Government tugs only, this service being secondary to towing duties. Fresh provisions are plentiful.

Tugs.—Repairs.—There are six powerful tugs fitted with salvage and fire appliances, and equipped with radio; two pilot vessels are also equipped with radio.

Large repairs to hull, boilers or machinery can be carried out. There is a graving dock and a floating dock at Congella, southward of Maydon quay. For details *see* Appendix II.

Town.—Durban is the largest city in Natal Province; the business portion is situated close northward of the harbour water frontage, the residential area lies northward on a slope known as the Berea, which overlooks the harbour and extends to Umgeni river (*Lat. 29° 49′ S., Long. 31° 02′ E.*).

In 1949, the population of Durban, including the suburbs, was 373,771, of whom 129,683 were Europeans.

During the year, 1949, the port was visited by 4,340 vessels.

A Government hospital at which seamen can be received, is situated at the Point, and in addition there are many other hospitals and nursing homes, both for Europeans and Non-Europeans.

Quarantine.—Arrangements for quarantine are made by the Port Health Authorities.

Deratisation.—*See* page 38.

Life-saving.—A line-throwing apparatus is kept at the Point near the Port Captain's office.

Communications.—There is regular communication by sea with Europe, India, the Far East, Australia, Canada, North and South America and other African ports.

There is regular communication by air with Cape Town via East London and Port Elizabeth, and also with Johannesburg. There are frequent services by air to Moçambique and East and Central Africa.

There is a radio station at Durban, *see* page 35.

Climatic tables.—*See* pages 69, 70.

Chart 3796.

UMGENI RIVER ENTRANCE TO CABO DA INHACA.—Coast.—Off-lying bank.—Beacons.—The entrance to Umgeni river, *see* page 178, is well defined between the slopes of the Berea hills, which are covered with houses, and the wooded hills on the northern bank; the latter are rapidly being built over.

A number of beacons for surveying purposes have been erected on the coast between the mouth of Umgeni river (*Lat. 29° 49′ S., Long. 31° 02′ E.*) and the mouth of Tugela river, about 43 miles north-eastward.

Between the mouths of Umgeni and Umhloti rivers, about 11 miles

Chart 3796.

north-north-eastward, the coast is generally sandy and is backed by hills of from 300 to 550 feet (91^{m}4 to 167^{m}6) high; a considerable amount of the country is under cultivation but there are large patches of trees both on the slopes and in the valleys.

A conspicuous water tower stands about 2 miles northward of the mouth of Umgeni river, and about one mile inland. There is a radio mast, about 6 cables east-north-eastward of this tower.

The mouth of Umhlanga river, about 7 miles north-north-eastward of the mouth of Umgeni river, is small and is not so clearly defined as that of most of the other rivers on this part of the coast, and the summits of the adjacent coastal hills are inconspicuous, being rounded and grassy.

The mouth of Umhloti river is readily identified by a steep, wooded bluff, 200 feet (61^{m}0) high, of dark appearance, near its southern entrance point, and also by the comparatively gradual slope of the hills on its northern bank.

Tongaat river enters the sea through a well-defined valley 5½ miles north-north-eastward of the mouth of Umhloti river; the coast is rocky for about three-quarters of a mile southward of its entrance. Between the mouths of these two rivers, the coastal hills are from 300 to 500 feet (91^{m}4 to 152^{m}4) high, and their seaward slopes are steep and partially wooded, with several deep ravines, but their summits are difficult to identify.

From the mouth of Tongaat river, the coast trends north-eastward and is sandy for 2 miles, the character of the coast then changes, and for the next 2 miles is very broken, and there are some prominent red cliffs about 50 feet (15^{m}2) high, with sandy beaches between them. For the next 3¾ miles, the coast is alternately rocky and sandy as far as the mouth of Umhlali river. Tongaat bluff, a dark, whale-backed hill, 460 feet (140^{m}2) high, partially covered with trees and with a farm-house on its summit, lies about 2¾ miles northward of the mouth of Tongaat river, and is conspicuous.

An off-lying bank, with a depth of 22 fathoms (40^{m}2) over it, was reported, in 1943, about 46 miles eastward of Tongaat bluff.

Between the mouths of Umhlali and Umvoti rivers, about 5 miles north-north-eastward, the coast continues to be rocky and sandy alternately, and there are a few sunken rocks lying close offshore; the coastal hills are between 200 and 350 feet (61^{m}0 and 106^{m}7) high, and have a few patches of trees on their seaward slopes, and some red scars in the valleys between them. Near the mouth of Umvoti river, the land is low and sandy, with the exception of the eastern extremity of its southern entrance point, which is rocky and fringed with sunken rocks, which extend as much as a quarter of a mile off it. Knob hill, 351 feet (107^{m}0) high, which has several large scars and, on its summit a peculiar spherical knob, lies one mile westward of the southern entrance point of Umvoti river, and is conspicuous from seaward.

Between the mouth of Umvoti river and the entrance to Tugela river, about 13 miles north-eastward, the coast is generally sandy and the coastal hills are somewhat featureless, being between 150 and 370 feet (45^{m}7 and 112^{m}8) high, with round, grassy and inconspicuous summits. The valleys formed by three small rivers, Umhlutani, Nonoti (*Lat. 29° 19′ S., Long. 31° 25′ E.*), and Sinkwazi (Sinkwasi), which enter the sea 3¼, 6 and 9 miles, respectively, north-eastward of

Charts 2089, 596, 748a, 2483.

Chart 3796.

the mouth of Umvoti river, are more readily distinguished, and form most useful marks in this vicinity.

Tugela river.—Shoal.—The entrance to Tugela river is easily identified from seaward by Tugela bluff, a black headland, 329 feet ($100^{m}3$) high, and covered with trees, which lies about 1½ miles south-westward of the low spit which forms the southern entrance point; Red hill, a conspicuous hill, 287 feet ($87^{m}5$) high, scarred with red and having a peculiar knob on its summit, is situated on the northern bank, nearly one mile within the entrance. The river is not navigable, the bar across the entrance being impassable, and, within the entrance it is shallow and useless for transport during the dry season.

In 1926, the sandbank at the entrance to Tugela river was reported to have extended seaward as much as three-quarters of a mile from the coast; the extent of this sandbank has not yet been ascertained.

Offshore depths.—Anchorage.—There are no off-lying dangers between the mouths of Umgeni and Tugela rivers and depths of 10 fathoms ($18^{m}3$) or more are found about a mile from the coast, and, except in the vicinity of the mouths of these two rivers, the depths increase rapidly to 20 fathoms ($36^{m}6$). The increase in depths of more than 20 fathoms ($36^{m}6$) is, however, very gradual off the northern part of this stretch of coast, and depths of less than 40 fathoms ($73^{m}2$), extend upwards of 20 miles from the coast in the vicinity of the mouth of Tugela river.

Anchorage is not recommended off this part of the coast, but, in case of necessity, the best holding ground will be found in depths of 25 fathoms ($45^{m}7$); the bottom is chiefly sand or mud, but there are some patches of rocky ground a few miles south-eastward of the mouth of Tugela river.

Current.—Between Cape Natal and the mouth of Tugela river, the current is weak, and when in depths of less than 50 fathoms ($91^{m}4$), is generally influenced in direction by the wind; in depths of more than 50 fathoms ($91^{m}4$), however, the current is more regular and sets south-westward with a velocity of from half a knot to one knot.

It seems possible that the southerly current is deflected from the coast by the bank extending off the entrance to Tugela river, and that consequently there is little or no current near the coast, until the southerly current strikes the coast again in the vicinity of Umtamvuna river.

Charts 3796, 2089.

Beacons.—A number of beacons for surveying purposes have been erected on the coast between the mouth of Tugela river and Cape St. Lucia, about 64 miles north-eastward.

Coast.—Dangers.—Between the mouths of Tugela (*Lat. 29° 13′ S., Long. 31° 30′ E.*) and Amatikulu rivers, about 11 miles north-eastward, the coast is sandy and the coastal ridge within it consists of rounded and grassy hills, between 250 and 460 feet ($76^{m}2$ and $140^{m}2$) high, with red scars on them in places; a single tree, standing on a flat summit, 387 feet ($118^{m}0$) high, situated about 6 miles north-eastward of the mouth of Tugela river, is conspicuous.

The coastal ridge is broken about 3 miles north-eastward of the mouth of Tugela river, by the valley through which Inyoni river flows, but, after emerging from this valley, the river flows along the coast just inside the sand ridges for about 5 miles, and in the rainy

Charts 596, 748a, 2483.

Charts 3796, 2089.

season, has a mouth about 8 miles north-eastward of the mouth of Tugela river.

The coast for about 2 miles northward of the mouth of Tugela river, is fringed with a reef which extends about 3 cables offshore, on which the sea breaks heavily ; outside the reef, the depths are very irregular, and there are shoal patches over which the depths are 15 feet and 3 fathoms (4^{m}6 and 5^{m}5), while depths of less than 6 fathoms (11^{m}0), are found one mile offshore for nearly 8 miles north-eastward of the mouth of Tugela river.

Chart 2089.

Amatikulu bluff is a dark, wooded hill, 313 feet (95^{m}4) high, about 8½ miles north-eastward of the mouth of Tugela river ; it is the most remarkable headland in the locality. Amatikulu river is readily identified by the bluff, close under which it passes, and, flowing north-eastward inside the beach, enters the sea 2½ miles from the bluff ; its mouth is open after heavy rains, but the sea breaks heavily across the entrance.

Rocky ledges, over which there are depths of from 3 to 5 fathoms (5^{m}5 to 9^{m}1), extend about 9 cables off the mouth of Amatikulu river and the adjacent coast.

Between the mouths of Amatikulu and Umlalazi rivers, about 13 miles north-eastward, the coast consists of innumerable shifting sand ridges formed just within the beach, behind which, the long, grassy ridges of hills appear noticeably lower than those southward of the mouth of Amatikulu river ; several farms and sugar plantations can be seen on these hills.

Vedette hill, 319 feet (97^{m}2) high, situated about 10 miles north-eastward of the mouth of Amatikulu river, has on its summit a group of buildings in a clump of trees which forms a conspicuous object ; Umlalazi river flows through the coastal ridge close north-eastward of Vedette hill, whence it flows along the coast just inside the sandy ridges, and enters the sea about 3½ miles eastward of Vedette hill.

The railway from Durban approaches the coast at Emoyeni hill, about 4 miles north-eastward of the mouth of Amatikulu river, and thence runs close to the coast, on the seaward side of the coastal ridge, until north-eastward of Vedette hill (*Lat. 28° 57′ S., Long. 31° 45′ E.*).

The extensive tableland of Ungoye mountain extends eastward and westward from its summit, 1,605 feet (489^{m}2) high, about 6 miles northward of Vedette hill ; its summits are not very distinctive, and it gradually decreases in height eastward, and after about 7 miles becomes merged in the surrounding country.

Glenton reef is an extension seaward of the coastal reef between the mouth of Amatikulu river and a position about 9 miles north-eastward, abreast the southern side of Vedette hill, where it extends as much as 1¼ miles offshore ; at this point it ends abruptly, its northern edge being close to the mouth of Umgovuna river. The depths on Glenton reef are from one to 2 fathoms (1^{m}8 to 3^{m}7), and the sea breaks heavily on it ; vessels should not approach this part of the coast within 3 miles, or within a depth of 12 fathoms (21^{m}9).

Tenedos shoal, situated about 1½ miles south-eastward of the mouth of Umlalazi river, has a least depth of 7 feet (2^{m}1) over it, and depths of from 15 to 24 feet (4^{m}6 to 7^{m}3), in a narrow channel between it and the coast ; this channel is only available for boats and in fine weather.

Charts 596, 748a, 2483.

Chart 2089.

Several rocky patches, with depths of from 21 to 30 feet ($6^{m}4$ to $9^{m}1$) over them, are situated about 1½ miles offshore between the northern edge of Glenton reef and Tenedos shoal.

Between the mouth of Umlalazi river and Durnford point (*Lat. 28° 53′ S., Long. 32° 01′ E.*), about 11 miles east-north-eastward, the coastal hills are generally low, few being over 200 feet ($61^{m}0$) high, and, with the exception of Mainhluyami, are sandy and covered with bush. Mainhluyami hill, 266 feet ($81^{m}1$) high, is situated 3½ miles east-north-eastward of the mouth of Umlalazi river ; it appears flat-topped when seen from eastward, and there is a dark, bushy summit, surmounted by a round tree, just westward of it.

Durnford point may be identified by Pudding hill, 287 feet ($87^{m}5$) high, a wooded hill about one mile westward of it.

Durnford point and the adjacent coast for about 2½ miles on either side of the point, is fringed with reefs on which the depths are from 15 to 30 feet ($4^{m}6$ to $9^{m}1$), which extend in places as much as 2½ miles offshore and break in bad weather. Vessels should give Durnford point a berth of 4 miles.

Port Durnford.—Light.—Offshore depths.—Port Durnford is situated about 4 miles east-north-eastward of the mouth of Umlalazi river, at the entrance to Umhlatuzana river, which is usually closed with sand ; its position can be identified by a gap in the hills through which the river flows, and by Mainhluyami, about half a mile westward.

A light is exhibited, at an elevation of 160 feet ($48^{m}8$), from a grey framework tower, 30 feet ($9^{m}1$) in height, situated on the coast about 1¾ miles eastward of Port Durnford.

A bank, on which the depths are less than 10 fathoms ($18^{m}3$), extends from 3 to 6 miles offshore between the north-eastern edge of Glenton reef and a position about 4 miles eastward of Durnford point ; on this bank the depths are irregular and the bottom is rocky, and in bad weather the sea breaks heavily in depths of from 7 to 8 fathoms ($12^{m}8$ to $14^{m}6$).

Current.—Caution.—In depths of over 100 fathoms ($182^{m}9$), the current sets south-westward at rates of from one to 2 knots, but, in depths of less than 100 fathoms ($182^{m}9$), a countercurrent setting north-eastward, with a velocity varying from a quarter to one knot, will generally be found in fine weather ; this north-easterly set is influenced by the wind, and with fresh north-easterly winds it rapidly changes its direction, and sets south-westward with a velocity varying according to the strength of the wind. During the survey of the coast by H.M.S. *Mutine* in 1911, the maximum velocity observed of this south-westerly set, was three-quarters of a knot.

During the survey in 1911, a current, which extended as much as 20 miles offshore, was occasionally observed to set between north and north-west, or directly onshore, with a velocity varying from a half to one knot ; the existence of this current is a serious danger to vessels proceeding along this part of the coast.

During strong southerly winds, heavy seas are sometimes encountered when crossing the edge of the 100 fathom ($182^{m}9$) bank, southward of Port Durnford.

Anchorage.—Directions.—Anchorage may be obtained off Port Durnford about 5 cables offshore, in 6 or 7 fathoms ($11^{m}0$ or $12^{m}8$), coral and sand, with the mouth of Umhlatuzana river bearing 338°,

Charts 596, 748a, 2483.

Chart 2089.

and Durnford point bearing 063°; this anchorage is a good one with easterly winds, but with westerly winds, heavy rollers soon set in and necessitate putting to sea.

Landing may occasionally be effected at the mouth of Umhlatuzana river, and stores have been landed here by surf boats in the months of July and August, but May and June appear to be better months in which to attempt landing.

Vessels are recommended to approach Port Durnford with the mouth of Umhlatuzana river bearing about 338°, in order to avoid Tenedos shoal westward, and the reefs off Durnford point eastward.

Coast.—Dangers.—A sandy beach, lined with breakers, and on which landing is practically impossible, stretches from Durnford point (*Lat. 28° 53′ S., Long. 32° 01′ E.*) to Cape St. Lucia, about 30 miles north-eastward; there are several lagoons a short distance within the coast.

For 2½ miles north-eastward of Durnford point, the coastal hills are wooded and are over 200 feet ($61^{m}0$) high, thence they decrease in elevation and form sandhills, with occasional patches of bush, for about 3 miles farther to the mouth of Umhlatuzi lagoon; the sea breaks heavily across the mouth of the lagoon. Umhlatuzi bluff, 100 feet ($30^{m}5$) high, a steep hill about one mile north-eastward of the lagoon entrance, appears well-defined when seen from eastward.

From Umhlatuzi bluff for about 4½ miles north-eastward, the coastal hills are of moderate elevation and are covered with bush. There are occasional patches of open grass country. About 9 miles north-eastward of Umhlatuzi bluff is Bonambi mission station, where there are a few houses and a church with a red spire, but they are not easily distinguishable from seaward. About one mile south-westward of Bonambi, there is a steep reddish bluff, 330 feet ($100^{m}6$) in height, and wooded on the summit. About 2 miles north-eastward of Bonambi is Neill peak, 348 feet ($106^{m}1$) in height, a conical, thickly wooded hill, which is the most conspicuous object in this locality.

The Nhlabane river enters the sea about 3 miles north-eastward of Bonambi; its mouth is inconspicuous, but a black bluff, 128 feet ($39^{m}0$) high, is situated on its western side, with a black, bush-covered hummock close southward of it, and there is a large sandy valley about one mile north-eastward of the mouth of the river.

Cone point, situated about 2½ miles north-eastward of the mouth of Nhlabane river, is surmounted by a small conical hill, 101 feet ($30^{m}8$) high, within which the hills are dark and thickly wooded.

A reef, over which the depths vary from 15 to 30 feet ($4^{m}6$ to $9^{m}1$), extends about three-quarters of a mile offshore, from about 2 miles north-eastward of the entrance to Umhlatuzi lagoon to one mile north-eastward of Bonambi mission station.

Nhlabane rock, over which there is a depth of 3 fathoms ($5^{m}5$), lies about 1¼ miles south-eastward of the mouth of Nhlabane river.

Vessels should give a wide berth to the coast between the entrance to Umhlatuzi lagoon and Cone point, especially in fine weather, when the sea is not breaking over the dangers.

Between Cone point and Cape St. Lucia, about 8½ miles north-eastward, the coastal hills gradually increase in elevation to over 500 feet ($152^{m}4$), and are bushy, with ridges of sand extending to the beach on their seaward slopes. About one mile north-eastward of

Charts 596, 748a, 2483.

Chart 2089.

Cone point, there is a grassy hill with a patch of bush on its summit, and one mile farther north-eastward, there is a bare sandhill, 348 feet ($106^{m}1$) high, which, when seen from eastward, appears steep and conspicuous.

Cape St. Lucia.—Light.—Radiobeacon.—Cape St. Lucia (*Lat. 28° 32′ S., Long. 32° 24′ E.*) is low and sandy and close within it is a hill, 536 feet ($163^{m}4$) high, on the seaward slope of which is a reddish sandpatch ; close northward of the cape are some light brown rocks, fringed with rocks awash which extend about 2 cables offshore. The M'jagatya hills, covered with forest and rising to elevations of over 600 feet ($182^{m}9$), form the coastal ridge from Cape St. Lucia for about 6½ miles northward, and terminate in a bluff, 294 feet ($89^{m}6$) high, close southward of the entrance to St. Lucia lake. On the slopes of the highest of these hills, which attains an elevation of 615 feet ($187^{m}5$), at 2¼ miles northward of Cape St. Lucia, there is a large sandpatch which rises to an elevation of 260 feet ($79^{m}3$). When seen at some distance the M'jagatya hills, and the hills around Cape St. Lucia appear from north-eastward and eastward as a group of islands. *See* view facing page 200, and view A on chart 2089.

A light is exhibited, at an elevation of 371 feet ($113^{m}1$), from a tower, 25 feet ($7^{m}6$) in height, painted with black and white bands, and situated about a mile northward of the cape. The lighthouse is difficult to distinguish from some distance.

A radiobeacon is situated at the lighthouse.

Current.—The following information was obtained from observations during the months of May, June, and July :—

Between Durnford point and Neill peak, the general direction of the current off the coast was south-westward, its velocity being from half a knot to one knot at between 2 and 3 miles offshore, and 2 knots at 11 miles seaward of Durnford point. In the former position, after the prevalence for a few hours of westerly winds, the direction of the current changed to north-eastward, maintaining a velocity of half a knot to one knot, and on one occasion reaching a velocity of 1½ knots ; this north-easterly set, however, quickly disappeared with a change of wind, and it was rarely that no current was experienced.

From a position off the coast between Neill peak and Cape St. Lucia, the current was always setting south-westward, or a point more westerly, its velocity close to the edge of the 100 fathom ($182^{m}9$) bank, being about 3½ knots, but, at from one to 2 miles offshore, its velocity was reduced to between one and 2 knots ; south-westerly winds retarded, and north-easterly winds accelerated, the velocity of this current.

With a smooth sea, a line of ripples was frequently observed close to the edge of the 100-fathom ($182^{m}9$) bank, the current over the bank running with considerably lessened strength.

Chart 2089, plan of St. Lucia bay.

St. Lucia bay.—Anchorage.—The entrance to St. Lucia lake lies about 8 miles northward of Cape St. Lucia, the bight off the entrance being known as St. Lucia bay. It may be identified by a conspicuous sandhill named Pelana (Sugar Loaf), 201 feet ($61^{m}3$) high, and overgrown with bush and scrub, which is situated nearly a mile southward of the southern entrance point to St. Lucia lake ; when approaching from southward, this hill is not visible until it bears less

Charts 596, 748a, 2483.

Chat 2089, plan of St. Lucia Bay.

than 300°. Discoloured water extends some distance seaward of the entrance to the lake (*Lat. 28° 24′ S., Long. 32° 26′ E.*).

The entrance to the lake is about one cable wide and is always open, and the tidal streams flow strongly through it; the sea breaks heavily on a bar across the entrance, on which the depth probably never exceeds 8 feet ($2^{m}4$). An hotel and several houses, some of which are visible from seaward, are situated nearly a mile inland, on the northern side of the entrance, but they are not conspicuous.

The bay has a sandy bottom with good holding ground, and the depths decrease gradually to the shore, but it is exposed to winds from south-south-west to north-east. A good berth is with Pelana hill bearing 247°, distant about one mile; southward of this position, the bottom is foul, and farther northward, the southerly swell is heavier. During 1937, the South African Government vessel *Africana* on several occasions rode comfortably at anchor in this position with strong south-westerly winds, but, with the wind more southerly, it would be necessary to put to sea.

Entrance to the lake across the bar is apparently never practicable, and the only landing place is under Pelana hill, where a reef extends northward for over 2 cables, parallel with the sandy beach; the sea breaks heavily on this reef, but its end is sharply defined, and there is comparatively smooth water inside it. With fresh north-easterly or easterly winds, the surf on the beach is so high that landing in ship's boats should not be attempted; should a boat capsize, the risk to life is great, as sharks are both numerous and voracious. Northward of the entrance, the breakers extend a long distance seaward, and around the shores of the bay, the surf extends from one to 2½ cables from the beach, even in fine weather.

Chart 2089.

Coast.—Between the northern entrance point to St. Lucia lake and Cape Vidal, about 18 miles north-north-eastward, the coast, from about 2 miles northward of the entrance, consists of a narrow sandy beach, with occasional ledges of rock; there are no off-lying dangers, except within a mile southward of Cape Vidal, where several sunken rocks, which usually break, lie about three-quarters of a mile southward of the cape and extend as much as 2 cables offshore, and immediately under Cape Vidal, where there are some rocks which extend northward for about 3 cables from its eastern extreme.

Within the beach, grassy and bushy-topped hills, from 100 to 150 feet ($30^{m}5$ to $45^{m}7$) high, and faced with sand, extend for about 2 miles northward of the entrance to the lake, thence a ridge of forest-covered hills, from 200 to 250 feet ($61^{m}0$ to $76^{m}2$) high, extends for a further 4½ miles northward, whence the hills become more open and grassy. Mount Tabor, 435 feet ($132^{m}6$) high, is rounded and grassy, and has on its summit a small concrete column, surmounted by a wooden tripod; it stands about 9 miles southward of Cape Vidal, and there is a conspicuous clump of casuarina trees at Mount Tabor mission station, about half a mile southward of this hill.

The open grassy hills extend for about 2 miles northward of Mount Tabor, whence they become faced with bush and continue for 5½ miles northward to Cape Vidal, the bush becoming denser as the cape is approached; about 2¼ miles northward of Mount Tabor, there is a dark, bush-covered hill, 367 feet ($111^{m}9$) high, which rises steeply

Charts 596, 748a, 2483.

Chart 2089.

from the beach, and is prominent when seen from either northward or southward.

Cape Vidal.—Cape Vidal (*Lat. 28° 08′ S., Long. 32° 34′ E.*) is conspicuous from all directions, the land close within it rising to a peak, 490 feet ($149^{m}3$) high, which has a long triangular patch of sand, visible when bearing less than 270°, extending to its summit; when seen from southward, three reddish-coloured patches appear on it. *See* view facing page 200, and view A on chart 2089.

In fine weather, landing may be possible in the small bay formed by the rocks extending northward from Cape Vidal.

Coast.—Between Cape Vidal and Leven point, about 12 miles northward, the coastal range is thickly wooded for about the first 7 miles and presents a series of summits. Northward of King Oscar hill, 429 feet ($130^{m}8$) in height, about 6½ miles northward of Cape Vidal, the coastal range is from 300 to 400 feet ($91^{m}4$ to $121^{m}9$) high, and is faced with sand, which extends halfway up its seaward slopes in places.

Close within Leven point is St. Mary's hill, 475 feet ($144^{m}8$) high, close northward of which are two broad sand-strips extending from the base to the summit of a high neck of land; these strips are visible when bearing less than 270°, and serve to identify Leven point from northward. From southward when close inshore, Leven point appears flat and sandy.

Between Leven point and Ochre hill, about 12½ miles northward, the coast is backed by wooded hills faced with sand, which have one distinctive peak, Gipsy hill, 419 feet ($127^{m}7$) high, situated about 8 miles northward of Leven point. Ochre hill, 401 feet ($122^{m}2$) high, has on its seaward face a very conspicuous red sand cliff, 266 feet ($81^{m}1$) high; the sea, in the vicinity of this cliff, is sometimes much discoloured from the red soil eroding from its base.

Between Ochre hill and Jesser point, about 11 miles northward, the wooded coastal range has three distinctive summits at 5, 7 and 9 miles, respectively, northward of Ochre hill. Inkonyana, the southernmost, is 400 feet ($121^{m}9$) high, and has a conspicuous sand-strip on its north-eastern slope; the centre hill, Imbumbe, is 432 feet ($131^{m}7$) high, and the northern hill, N'tabende (Havergal hill), 452 feet ($137^{m}8$) high, is a very conspicuous conical hill, appearing flat-topped when seen from eastward, and having a conspicuous sand-strip close southward of it. From N'tabende, for 2 miles northward to Jesser point, the coastal hills decrease in height and terminate in a dark bluff, 120 feet ($36^{m}6$) high, covered with trees and bush, and prominent from seaward, which is situated close within Jesser point on the southern side of Sordwana road. Jesser point (*Lat. 27° 33′ S., Long. 32° 41′ E.*) is low and fringed with rocks, which extend for 4 cables northward of it and on which the sea breaks heavily.

Dangers.—Offshore depths.—Caution.—Leven shoal is a narrow ridge of rock and coral, with depths of from 2 to 5 fathoms ($3^{m}7$ to $9^{m}1$) over it, and steep-to on both sides, lying nearly parallel with the coast and about 6 cables offshore. It is connected to the coast at its southern end, about 2 miles northward of Leven point.

Leadsman shoal, over which there is a least depth of 3 fathoms ($5^{m}5$), lies parallel with the coast, about 6 miles northward of Leven point, and about three-quarters of a mile offshore.

A coral shoal over which there is a least depth of 21 feet ($6^{m}4$),

Charts 596, 748a, 2483.

Chart 2089.

lies about 9 miles northward of Leven point, and about three-quarters of a mile offshore.

As these shoals are all steep-to and seldom break, vessels should keep in depths of more than 30 fathoms (54^{m}9), when in this vicinity.

There are three remarkable gullies in the sea bed off this part of the coast, where depths of over 100 fathoms (182^{m}9), are found about a mile from the coast; the first is off Leven point; the second, about 19 miles farther northward, off Imbumbe hill, and the third, about 4 miles north-north-eastward of Jesser point. Care is necessary when sounding at night or in thick weather, as soundings obtained in any of these gullies, might give a wrong estimate of the distance offshore.

Chart 2089, plan of Sordwana road.

Sordwana road.—Anchorage.—From Jesser point (*Lat. 27° 33′ S., Long. 32° 41′ E.*), the coast trends north-westward for about 4 cables, forming a slight indentation which is fronted by Sordwana road. Sordwana river, a small and insignificant stream, enters the sea close westward of Jesser point through a narrow entrance with a rocky bottom, which dries 4 feet (1^{m}2); the coast thence north-westward consists of sandhills, from 40 to 200 feet (12^{m}2 to 61^{m}0) high. Sordwana road is open seaward, and affords no better shelter than any other open anchorage on this coast; there is considerable swell and the holding ground, being partly rock, is poor, and is worse inshore than farther out. Strong onshore winds render the anchorage untenable.

Power vessels may obtain some slight shelter from Jesser point, in a position about 5 cables offshore, in 7 fathoms (12^{m}8), with the extremity of Jesser point bearing 203°, distant about 6 cables. A shoal patch, over which there is a depth of 27 feet (8^{m}2), is situated nearly on the same line of bearing as the anchorage berth, but 3½ cables farther north-eastward.

The position of the best landing place is indicated on the plan, and some slight protection to it is given by the rocks which extend about 4 cables northward of Jesser point, but, owing to the heavy surf and rollers which usually prevail, landing is generally dangerous and at times impracticable, even to surf boats. Even in the finest weather, landing in a ship's boat should on no account be attempted.

Chart 2089.

Coast.—Dangers.—Abreast of Sordwana road and about 40 miles inland, the Lebombo Berge range of mountains commences and stretches northward, parallel with the coast, the intervening country being flat and low.

Between Jesser point and Sordwana point, about 7 miles northward, and thence for 6 miles further northward to Hully point, the coast is backed by a range of high, thickly-wooded hills, the seaward slopes of which are partially faced with sand. Dumile hill, 448 feet (136^{m}6) high, dome-shaped and conspicuous from all directions, is situated about one mile northward of Sordwana point (*Lat. 27° 26′ S., Long. 32° 43′ E.*).

A reef of sunken rocks which usually break, is situated abreast Dumile hill, about 2 cables offshore, and there is a similar reef about 1½ miles farther northward, also about 2 cables offshore.

Hully point terminates in a small rocky ledge. From Dumile hill the coastal range drops steeply to an elevation of about 200 to 250 feet

Charts 596, 748a, 2483.

Chart 2089.

($61^{m}0$ to $76^{m}2$), and forms a flat ridge extending about 9 miles northward, whence it drops almost to sea-level abreast a small rocky point, situated about 4 miles northward of Hully point. The range is heavily wooded, and is faced with sand in places to an elevation of 200 feet ($61^{m}0$), but, at its northern end, it is wooded to just above the high-water mark. About 6 miles northward of Dumile hill, there is a red house, which is distinctive, as there is no other building visible from seaward between Cape Vidal and the mouth of Kosi river.

Some detached rocks, one of which dries one foot ($0^{m}3$), are situated about 3¾ miles northward of Hully point.

Between the small rocky point mentioned above and the mouth of Kosi river, about 23 miles northward, for the first 9 miles the coast is less wooded and the coastal hills are lower, being from 200 to 300 feet ($61^{m}0$ to $91^{m}4$) in height, and backed by grassy hills, whose summits are visible from seaward. Thence the coast consists of a series of sandy beaches with intervening rocky points, and the coastal hills are generally grassy with occasional patches of bush as far as Boteler point, about 7½ miles northward. There is a distinctive reddish sand patch on the summit of a hill, about 4 miles south-south-westward of Boteler point and about 8 cables inland. A remarkable black rock, about 12 feet ($3^{m}7$) in height, is situated on the beach about one mile east-south-eastward of the reddish sand patch.

A flat, dark-coloured rock, 50 feet ($15^{m}2$) in height with a steep seaward face, and, when viewed from some distance seaward, resembling a vessel close inshore, stands about 7½ miles southward of Boteler point (*Lat. 27° 01'. S., Long. 32° 52' E.*).

The best landing place on the coast between Sordwana road and Ponta do Ouro, *see* page 195, would appear to be in a small bay under Boteler point, which is sheltered by some rocks.

Close northward of Boteler point, there is a low neck of land which separates Nhlange (Kosi) lake from the sea, thence the coastal hills rise gradually to a flat-topped ridge about 250 feet ($76^{m}2$) in height, which extends to about one mile southward of Kosi river entrance (*Lat. 26° 54' S., Long. 32° 53' E.*). This ridge rises steeply from the sea and its seaward face is thickly covered with bush, but its summit is cultivated. There is a remarkable sandhill, 309 feet ($94^{m}2$) in height, near its southern end.

A dangerous reef, on which the sea does not always break, lies about 5 miles northward of Boteler point, with its northern end as much as 5 cables offshore; the position of this reef should be given a wide berth.

Chart 2089, plan of Kosi river.

Kosi river entrance.—Anchorage.—Kosi river (*Lat. 26° 54' S., Long. 32° 53' E.*) enters the sea, about 7 miles northward of Boteler point; the entrance is about half a cable wide and the low land near it is conspicuous from north-eastward. There is a sandy beach on either side of the entrance, and a sandy and rocky bar across it, with a depth of about 3 feet ($0^{m}9$) over it at low water. The tidal streams run strongly through the entrance, and the sea breaks heavily on the bar and for about 2 cables seaward. Within the entrance, there is a tidal and shallow lagoon, which is connected with a series of lakes which extend for about 9 miles, the largest being Nhlange lake. On a hill about one mile westward of the entrance and overlooking the

Charts 596, 748a, 2483.

Chart 2089, plan of Kosi river.

lagoon, there is a mission station which is visible seaward from northeastward.

There is no better shelter off the mouth of Kosi river than at other exposed roadsteads on this coast, but anchorage may be obtained in about 10 fathoms (18^{m}3), about 6 cables from the coast, with the mission station bearing about 270° and in line with the entrance.

Landing is always difficult, and is generally attended with danger and, although it has been found practicable with the aid of surf boats and trained crews, it should never be attempted by ordinary ship's boats. The best place at which to make the attempt, is about 3 cables northward of the entrance to the river, and boats should never attempt a landing southward of the entrance.

Chart 2089.

Coast.—Between the mouth of Kosi river and Ponta do Ouro, a dark low cliff, about 3 miles northward, the coast consists of a sandy beach, backed by bush-topped hills which are faced with sand, and which reach an elevation of 395 feet (120^{m}4), at Monte do Ouro, situated close within Ponta do Ouro.

Light.—A light is exhibited, at an elevation of 374 feet (114^{m}0), from a lantern on a white building, 17 feet (5^{m}2) in height, situated on Monte do Ouro.

Coast.—**Beacons.**—Between Ponta do Ouro and Cabo de Santa Maria, the northern extreme of Inhaca peninsula, the coast has few irregularities and no known off-lying dangers. The coastal hills are from 200 to 400 feet (61^{m}0 to 121^{m}9) high, and are thickly wooded close to Cabo de Santa Maria.

About 6 miles northward of Ponta do Ouro there are three conspicuous peaks, of which Pico Florenço, 384 feet (117^{m}0) high, is the highest.

Matonde beacon, about 9 miles northward of Pico Florenço, is an iron beacon, 16 feet (4^{m}9) in height, standing on a sandhill near the coast, at an elevation of 351 feet (107^{m}1).

Grassy hill, 246 feet (75^{m}0) high, about 10 miles northward of Matonde beacon and three-quarters of a mile within Ponta Milibangalala, is conspicuous from the northward.

Tane beacon, about 15 miles northward of Matonde beacon, is a small beacon, standing at an elevation of 298 feet (90^{m}8), on the southwestern summit which rises over Ponta Chemucane.

Baixo de Sao João, a rocky shoal, with a depth of 49 feet (14^{m}9) over it, lies about 2½ miles eastward of Tane beacon.

Rocha Ulué (Steamer rock) (*Lat. 26° 15′ S., Long. 32° 57′ E.*) is a dark rock lying close to the high water mark at Punta Mucombo, about 5½ miles northward of Ponta Chemucane ; it is 15 feet (4^{m}6) in height and 170 feet (51^{m}8) in length, and when seen from a distance resembles a steam vessel.

About 2½ miles northward of Punta Mucombo is Dundas hill, 240 feet (73^{m}2) high, on the seaward slope of which are two sandy tracks, which cross diagonally and form a prominent mark when approaching from the southward until abreast the hill.

Chart 644.

Monte Colato, 285 feet (86^{m}9) high, round-topped and somewhat resembling a haycock, stands about 7 miles northward of Dundas hill and half a mile southward of Cabo de Santa Maria.

Charts 648, 596, 597, 748a, 2483.

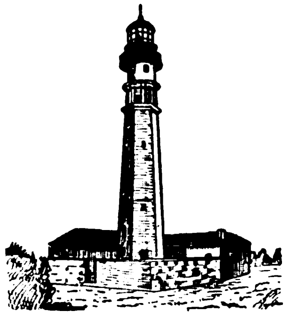
Chart 644.

Baixo Santa Maria, a rocky shoal with a least depth of 56 feet (17$^{\mathrm{m}}$1), lies about 2½ miles east-south-eastward of Cabo de Santa Maria.

Ponta Torres, the southern extreme of Ilha da Inhaca, lies about half a mile north-westward of Cabo de Santa Maria ; the inlet between them has a bar across it, the channel being on the southern side, close to Cabo de Santa Maria. The sea frequently breaks across the entrance, in which there are dangerous rocks.

Monte Botelho, 315 feet (96$^{\mathrm{m}}$0), and Monte Inhaca, 373 feet (113$^{\mathrm{m}}$7) high, both stand near the coast, about 2½ and 5 miles, respectively, northward of Ponta Torres ; the summit of Monte Inhaca is dome-shaped and wooded, and on it stands a white, pyramidal, masonry beacon, 16 feet (4$^{\mathrm{m}}$9) in height, and surmounted by a cylinder.

Cabo da Inhaca, the north-eastern extreme of Ilha da Inhaca, lies about 2 miles north-north-eastward of Monte Inhaca (*Lat. 26° 00′ S., Long. 32° 59′ E.*) ; it is a sandy point and the land close within it rises to a remarkable square-topped sandy hummock, which stands out against the darker land behind it. *See* view B on chart 2089.



Inhaca light, from south-eastward.
(Original prior to 1949.)

In 1949, a conspicuous wreck lay about 4 cables northward of Cabo de Inhaca.

Lights.—Signal station.—A light is exhibited, at an elevation of 357 feet (108$^{\mathrm{m}}$8) from a red, hexagonal, concrete tower 102 feet (31$^{\mathrm{m}}$1) in height, situated on a sandhill, about 4 cables south-westward of Cabo da Inhaca. This light is also visible from the air.

A light is exhibited, at an elevation of 71 feet (21$^{\mathrm{m}}$6), from a white beacon on three columns, 75 feet (22$^{\mathrm{m}}$9) in height, situated about half a mile north-westward of Cabo da Inhaca lighthouse.

A signal station, with which vessels can communicate by the International Code of Signals, is situated near Cabo da Inhaca lighthouse ; it is in telegraphic communication with Lourenço Marques.

BAIA DE LOURENÇO MARQUES AND APPROACHES.—

General remarks.—Baía de Lourenço Marques (Delagoa bay) is entered between Cabo da Inhaca and Ponta da Macaneta, about 15 miles west-north-westward. The approach to the bay is encumbered by a chain of shoals, which extend about 19 miles northward from the northern end of Ilha da Inhaca ; there are several channels between these shoals by which vessels can enter the bay. The principal channel is Canal do Sul, which is entered close northward of Cabo da Inhaca ; in 1949, there was in this channel a least depth of 23 feet (7$^{\mathrm{m}}$0) on the leading line, but the bar is subject to change. Within the bay, large areas are encumbered with shoals, but anchorage may be obtained, in depths of from 6 to 8 fathoms (11$^{\mathrm{m}}$0 to 14$^{\mathrm{m}}$6), about 2 or 3 miles from the north-western shore, and, at the port of Lourenço Marques, situated on the northern bank of Rio Espirito Santo, at the western corner of the bay, vessels that can cross the bar in the entrance to that port, may anchor abreast the town or berth alongside a wharf ; in

Charts 2089, 648, 596, 597, 748a, 2483.

Chart 644.

1951, there was a least depth of 24 feet ($7^{m}3$), in the dredged channel leading into Rio Espirito Santo (*Lat. 26° 00′ S., Long. 32° 35′ E.*).

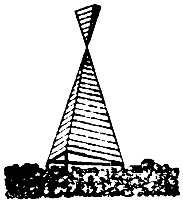
The magnetic variation changes rapidly in Baía de Lourenço Marques; attention is called to the isogonic lines drawn on charts 644 and 646.

Northern side of approach.—Beacon.—The coast northward of Baía de Lourenço Marques, from Ponta da Macaneta to a position close eastward of Monte Cutfield, about 19 miles northward, consists of sandhills, partially covered with bush and about 140 feet ($42^{m}7$) high; Monte Cutfield 175 feet ($53^{m}3$) high, is the highest of these.

When bearing about 326°, Monte Cutfield appears as a long, dark, bushy hill with two summits, the western being dark and the eastern higher and having a streak of sand along its edge. From this bearing no large bare sandhills or ridges are visible on the hills southward of Monte Cutfield and these hills have more bushes than sand, whereas, on the hills northward, there is more sand than bushes, and the sand frequently stretches to their summit.

When bearing about 267°, it appears as a rather long, dark hill with two summits, neither of which is well-defined. The eastern or right-hand part, slopes very gradually to the coastal hills, its ridge being a stretch of bare sand, and there is a smaller horizontal streak of sand under its left-hand part.

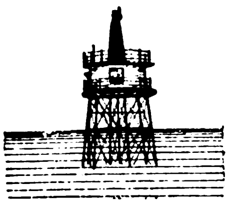
A very large pocket, or crater, of sand is situated on its south-western slope, and stands out very conspicuously during the forenoon. This crater is not visible on bearings of less than 327°, and on this bearing it begins to open out near the summit. When bearing 337°, it appears as a broad sand strip, stretching from the summit nearly to the base, which develops into the shape of a scoop, when bearing about 352°. *See* view facing page 201.



Monte Cutfield beacon.
(*Original prior to* 1911.)

A white, pyramidal beacon, surmounted by a black triangle, point downwards, 40 feet ($12^{m}2$) in height, stands on Monte Cutfield; it is difficult to distinguish.

Light.—Dangers in approach.—A light named Farol de Vasconcelos e Sá, is exhibited at an elevation of 48 feet ($14^{m}6$) from a structure, 56 feet ($17^{m}1$) in height, consisting of a small tower 16 feet ($4^{m}9$) high, on an iron framework structure, situated near the northern extreme of Baixos da Inhaca.



Farol de Vasconcelas e Sá, from south-westward.
(*Original dated* 1944.)

Danae shoal (*Lat. 25° 54′ S., Long. 33° 03′ E.*), over which there is a least depth of 11 feet ($3^{m}4$), lies about 5 miles north-eastward of Cabo da Inhaca. It is reported that the sea sometimes breaks heavily over Danae shoal in calm weather with little or no swell. The barracks on Black Bluff, *see* below, in line with the white triangular light-beacon westward of Cabo da Inhaca, bearing 240°, lead about one mile southward of Danae shoal; Monte Inhaca beacon in line with Cabo da Inhaca lighthouse, bearing 208°, leads about half a mile north-westward of the shoal. This shoal is covered by the

Charts affected, 2089, 648, 596, 597, 748a, 2483.

Chart 644.

red sector of Cabo da Inhaca light between the bearings of 212° and 224°, and by a *red* sector of Farol Vasconcelos e Sá light, at the northern end of Baixos da Inhaca, between the bearings of 273° and 282°.

The channels through the shoals, which extend northward from Ilha da Inhaca, are liable to frequent changes and with the exception of Canal do Sul, the principal one, they are not marked by buoys.

Baixos da Inhaca, over which there is a least depth of 3 feet ($0^{m}9$), extends about 5 miles northward from the outer edge of a sand flat, which dries, between Cabo da Inhaca and Ilha dos Portugueses, situated about 4 miles westward of Cabo da Inhaca lighthouse (*Lat. 25° 59′ S., Long. 32° 59′ E.*). The shoal extends northward and eastward of Farol de Vasconcelos e Sá, and depths of less than 6 fathoms ($11^{m}0$) exist about 3 cables northward, 5 cables north-eastward and 6 cables eastward of the light-structure. Baixos da Inhaca is covered by a *red* sector of Farol de Vasconcelos e Sá, between the bearings of 318° and 021°.

Baixo do Meio, extending in a north-north-westerly direction for about 3 miles, lies about 1½ miles eastward of Farol de Vasconcelos e Sá, and has a least depth of 15 feet ($4^{m}6$), and general depths of from 17 to 33 feet ($5^{m}2$ to $10^{m}1$) over it.

Domette shoal lies about 7 miles northward of Farol de Vasconcelos e Sá and has a least depth of 13 feet ($4^{m}0$) over it. The general depths between Baixo do Meio and Domette shoal vary from 21 to 37 feet ($6^{m}4$ to $11^{m}3$), but there are several detached shoals with depths of from 13 to 18 feet ($4^{m}0$ to $5^{m}5$), the positions of which are best seen from the chart.

Paiva Manso shoal, lies about 9 miles northward of Farol de Vasconcelos e Sá with a least depth of 13 feet ($4^{m}0$). There are depths of from 14 to 25 feet ($4^{m}3$ to $7^{m}6$), in the passage between it and Domette shoal.

Cutfield shoal, lies about 14 miles northward of Farol de Vasconcelos e Sá and has a least depth of 11 feet ($3^{m}3$). The depths between it and Paiva Manso shoal vary from 13 to 30 feet ($4^{m}0$ to $9^{m}1$).

A coral patch, with a least depth of 38 feet ($11^{m}6$), lies about 6½ miles eastward of Cutfield shoal.

Channels.—Leading line.—Light-buoys.—Canal do Sul, lies eastward of Baixos de Inhaca, between it and Baixo do Meio.

The light-beacon, situated about half a mile north-westward of Cabo da Inhaca lighthouse, in line with that lighthouse, bearing 142½°, leads through Canal do Sul.

No. 1, black, conical light-buoy, exhibiting a *green flashing* light *every four seconds*, is moored on the western side of the leading line, about 1¾ miles south-eastward of Farol de Vasconcelos e Sá.

No. 2, red, can light-buoy, exhibiting a *red flashing* light *every four seconds*, is moored on the western side of the leading line, about 1¼ miles south-eastward of Farol de Vasconcelos e Sá.

The above light-buoys are moved to meet changes in the channel, but, in 1947, it was stated the channel had not altered over a period of several years.

Canal do Meio, a narrow channel, lies between Baixo do Meio and the southernmost detached shoals southward of Domette shoal. The tidal streams set almost directly across Canal do Meio, and, with a west-going tidal stream, care is necessary to avoid being set north-

Charts 2089, 648, 596, 597, 748a, 2483.

Chart 644.

westward of the channel; Canal do Meio should only be used by coasting vessels of shallow draught.

Canal do Norte lies between Cutfield shoal and the mainland, about 5 miles north-westward; there are depths of 5 to 10 fathoms ($9^{m}1$ to $18^{m}3$) in Canal do Norte, but vessels are advised not to use it as it is not buoyed.

Pilots.—Pilotage is compulsory for merchant vessels. Pilots may be obtained from the pilot vessel, which is anchored about 2½ miles north-westward of Cabo da Inhaca; the vessel displays a flag with a dark "P" on a white ground by day, and shows the regulation lights for a vessel at anchor by night. Vessels requiring a pilot should apply to the pilot vessel.

Pratique.—Vessels requiring pratique should show a *green* light when passing Cabo da Inhaca signal station, and should also show it again when passing Ponta Vermelha signal station, *see* page 205. Mail or passenger steamers are visited by the Health officer at any hour of the day or night, and other vessels, during the day up to 2200.

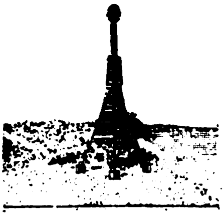
Anchorage.—Anchorage, sheltered from southward, may be obtained in the approach to Canal do Sul in a bight in the eastern side of Baixos da Inhaca, known as Canal dos Portugueses, in depths of 6 and 7 fathoms ($11^{m}0$ and $12^{m}8$), with Cabo da Inhaca lighthouse bearing 136°, distant about 3 miles. In 1935, H.M.S. *Daffodil* rode out, without dragging, a south-easterly gale of force 9, in a position with Cabo da Inhaca lighthouse in line with the light-beacon north-westward of it, distant 3½ miles from the lighthouse.

Eastern and southern shores of Baía de Lourenço Marques.—Light.—Beacons.—Black bluff (*Lat. 26° 00′ S., Long. 32° 55′ E.*), the north-western extreme of Ilha da Inhaca, is situated about 5 miles west-south-westward of Cabo da Inhaca, the intervening coast being fronted by a bank which dries, which extends as much as 2¼ miles offshore. On the north-western side of this bank is Ilha dos Portugueses, about 25 feet ($7^{m}6$) high, sandy and covered with bushes; Ponta dos Elefantes, its western extreme, is steep-to. There is a leper establishment on the western side of the island.

Quartel light, is exhibited at an elevation of 196 feet ($59^{m}7$) from the barracks, a white building, 33 feet ($10^{m}1$) in height, situated on the summit of Black bluff.

A white, pyramidal beacon, 59 feet ($18^{m}0$) in height, and surmounted by a disc, stands on Ponta dos Elefantes.

A beacon stands, at an elevation of 212 feet ($64^{m}6$), close to the top of a conspicuous broad streak of red sand, extending from the base to the summit of the coastal ridge, about 1¼ miles south-south-westward of Black bluff.



Ponta dos Elefantes beacon.
(*Original dated* 1944.)

Between Ponta dos Elefantes and Ponta Maone, the bold southern entrance to Rio Espirito Santo, situated about 16½ miles westward of Ponta dos Elefantes, the southern portion of Baía de Lourenço Marques is encumbered with extensive shoals, which almost entirely block its approach. Off the western coast of Ilha da Inhaca, there is an anchorage which is known as Portinho da Inhaca, and further

Charts 2089, 648, 596, 597, 748a, 2483.

Chart 644.

southward in the south-eastern corner of the bay is Baía de Machangulo. Rio Maputo enters the bay at its south-western corner. (For description of the above, *see* page 208.)

A white, pyramidal beacon, 39 feet ($11^{m}9$) in height, surmounted by a lozenge-shaped mark, stands on Ponta Maone (*Lat. 26° 02′ S., Long. 32° 36′ E.*).

A beacon stands on Ponta das Tres Marias, about 6¾ miles south-south-eastward of Ponta Maone.

North-western shore of Baía de Lourenço Marques.—Dangers.—Lights.—Beacons.—Ponta da Macaneta, the north-eastern entrance point of Baía de Lourenço Marques, situated about 15 miles west-north-westward of Cabo da Inhaca, is a low, sandy point which forms the eastern entrance point to Rio Incomati; for details of this river, *see* page 209.

Between Ponta da Macaneta and Ponta Vermelha, the northern entrance point to Rio Espirito Santo, about 11 miles south-westward, the shore of the bay is fronted with banks on which the depths are less than 3 fathoms ($5^{m}5$); Ponta Vermelha is a bold, red bluff, 102 feet ($31^{m}1$) high. The Polana hotel, a large light, yellow building, situated nearly a mile north-north-eastward of Ponta Vermelha, is a very prominent landmark.

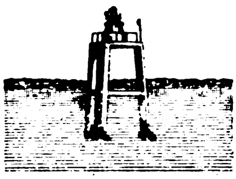
Ilha Xefina Grande is a low, sandy island, lying nearly parallel with the shore, its northern extreme being about 3½ miles south-westward of Ponta da Macaneta; the lower part of the island is white sand and difficult to distinguish from the mainland behind it, but there are some hummocks on it, and parts of the island are covered with dense bush.

Xefina do Meio lies between Ilha Xefina Grande and Ponta da Macaneta and is about one mile in length, with its northern extremity about one mile westward of Ponta da Macaneta. The bar in the approach to the mouth of Rio Incomati lies about 2½ miles east-south-eastward of Ponta Macaneta.

A bank, on which the depths are less than 3 fathoms ($5^{m}5$), extends 2½ miles north-eastward and 4 miles eastward of Ponta Macaneta. On the southern part of this bank is Parcel da Xefina, which dries. The bank gradually decreases in width to 4 cables at the southern extreme of Ilha Xefina Grande.

Chart 646.

Restinga da Xefina is a drying spit, which extends southward about 4 cables from Ponta Garapão, the southern extremity of Ilha Xefina Grande (*Lat. 25° 56′ S., Long. 32° 41′ E.*). In 1949, this spit was reported to be extending southward.



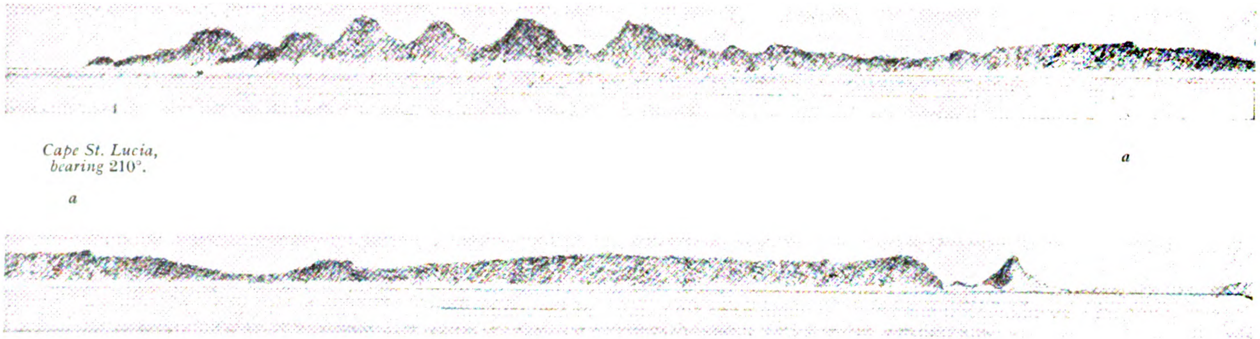
Xefina light, from southward.
(*Original dated* 1944.)

A light is exhibited, at an elevation of 31 feet ($9^{m}4$), from a concrete pile structure, 36 feet ($11^{m}0$) in height, situated close southward of the drying spit.

A light is exhibited, at an elevation of 30 feet ($9^{m}1$), from a yellow tower, 31 feet ($9^{m}4$) in height on the Naval club, situated about 3½ cables northward of Ponta Vermelha.

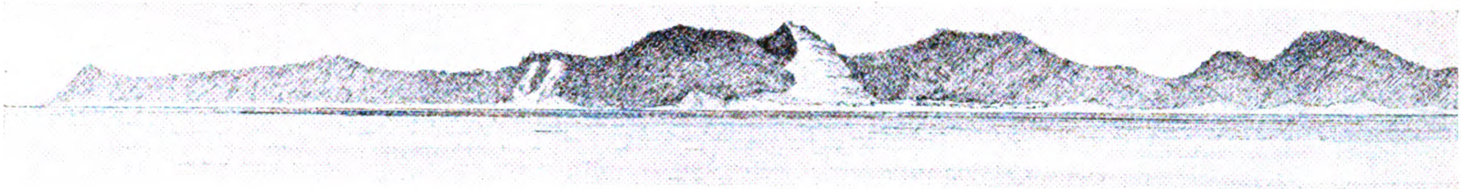
A white beacon, consisting of a column, formerly a portion of an old light-tower, surmounted by a pole, is situated three-quarters of a mile northward of Restinga da Xefina light-structure. A house with a

To face page 200.



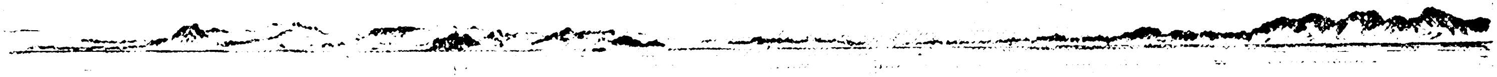
View, in 2 parts, of approach to Cape St. Lucia from north-north-eastward.

(*Original dated* 1882.)



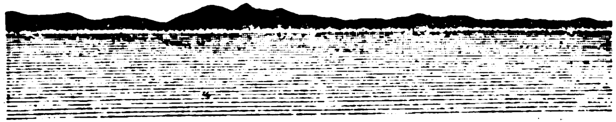
Vidal peak from north-eastward.

(*Original dated* 1882.)


Remarkable dark cliff, bearing 315.
Lagoa river entrance.

Entrance to Lagoa river from south-eastward.

(*Original dated* 1882.)


Monte Cutfield.

Monte Cutfield from south-eastward distant 4 miles.

(*Original dated* 1941.)

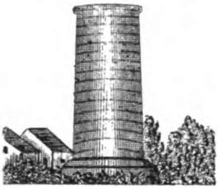
Chart 646.

galvanised roof is situated about half a cable westward of the beacon, and is reported to be conspicuous and to be visible for about 10 miles.

A beacon is situated about 1¼ miles northward of Restinga da Xefina light-structure, and another beacon stands on Ponta Macaneta, about 4½ miles further north-north-eastward.

Maotas beacon, a white, pyramidal beacon, surmounted by a disc, 39 feet ($11^{m}9$) in height, stands on the north-western shore of the bay nearly 3 miles north-westward of Restinga da Xefina light-structure.

A circular stone tower, 59 feet ($18^{m}0$) in height, formerly a part of a light-tower, stands on Ponta Vermelha.



Ponta Vermelha old light-tower. (*Original prior to* 1924.)

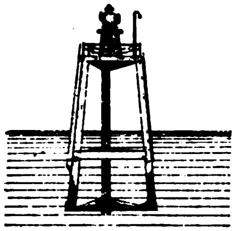
A triangular beacon, 48 feet ($14^{m}6$) in height, the white top of which has an apex which shows pale yellow seaward and buff-coloured towards the harbour, stands at an elevation of 140 feet ($42^{m}7$), about 2½ cables westward of Ponta Vermelha.

Chart 644.

Off-lying dangers in Baía de Lourenço Marques.—Light-buoys.—Light.—Channels.—Baixo Fawn, with a depth of 18 feet ($5^{m}5$) over it, is the north-eastern of a line of detached shoals with depths of from 7 to 18 feet ($2^{m}1$ to $5^{m}5$) over them, and is situated about 3¼ miles westward of Farol de Vasconcelos e Sá.

No. 3, black conical light-buoy, exhibiting a *green flashing* light *every four seconds*, is moored about one mile eastward of Baixo Fawn.

The barracks on Black bluff in line with the white beacon on Ponta dos Elefantes, bearing 157°, lead nearly one mile eastward of Baixo Fawn. *See* view on chart 644.



Baixo Ribeiro, from southward. (*Original dated* 1944.)

Baixo Ribeiro, a shoal with a least depth of 6 feet ($1^{m}8$) over it, is situated about 5 miles west-south-westward of Farol de Vasconcelos e Sá (*Lat. 25° 53′ S., Long. 32° 54′ E.*).

A light is exhibited, at an elevation of 38 feet ($11^{m}6$), from a concrete pile structure, 43 feet ($13^{m}1$) in height, situated near the southern end of Baixo Ribeiro.

A *red* sector of the light covers Baixo Fawn and the shoals north-eastward of Baixo Ribeiro light-structure between the bearings of 077° and 242°.

Baixo Serra, a shoal with a least depth of 16 feet ($4^{m}9$) over it, is situated about 2¼ miles east-south-eastward of Restinga da Xefina light-structure. This shoal is covered by a *red* sector of Baixo Ribeiro light, between the bearings of 054° and 069°.

Baixo Capitania, a shoal with a least depth of 14 feet ($4^{m}3$) over it, is situated about 4 miles south-eastward of Restinga da Xefina light-structure.

Passagem da Xefina Grande, the channel between the line of shoals extending north-eastward of Baixo Ribeiro and Parcel da Xefina, has a least depth of 21 feet ($6^{m}4$) about 1½ miles westward of Baixo Ribeiro light structure.

Passagem do Norte, the channel between Baixo Serra (*Lat. 25° 57′ S.,*

Chart 644.

Long. 32° 44′ E.) and Ilha Xefina Grande, has depths of from 28 to 44 feet ($8^{m}5$ to $13^{m}4$) in the channel.

A light-buoy, painted in red and white bands, known as Boia da Confluência, and exhibiting a *white flashing* light *every two and a half seconds*, is moored nearly 1½ miles east-north-eastward of Restinga da Xefina light-structure.

Passagem do Sul, the channel between Baixo Capitania and Baixo Serra, has depths of from 35 to 49 feet ($10^{m}7$ to $14^{m}9$) in the channel.

Anchorages.—The anchorage recommended for deep-draught vessels is in depths of from 36 to 48 feet ($11^{m}0$ to $14^{m}6$), with Restinga da Xefina light-structure bearing 295°, distant about 2½ miles. Vessels of moderate draught may obtain anchorage somewhat closer to the light-structure, in from 27 to 30 feet ($8^{m}2$ to $9^{m}1$), with the light-structure bearing 263°, distant about 2 miles, or if using Passagem do Sul, with the light-structure bearing 308°, distant 1¾ miles. There is also anchorage further westward, near the entrance to the dredged channel, Canal da Polana, in depths of about 19 to 24 feet ($5^{m}8$ to $7^{m}3$).

Tidal streams.—Seaward of the line of shoals in the approach to the bay, the north-going tidal stream, or that of the in-going stream, has a maximum spring velocity of about 2 knots, with a strong in-draught towards Canal do Sul, across which it sets obliquely, necessitating caution when passing through that channel; the out-going tidal stream sets in the opposite direction at about the same rate.

Within the line of shoals, the in-going tidal stream sets south-westward over Parcel da Xefina, and enters Rio Espirito Santo with a maximum velocity of from one to 3 knots at neaps and springs respectively; the out-going tidal stream sets in the opposite direction at about the same rate.

Local magnetic anomalies.—Caution.—Local magnetic anomalies are reported to exist in some parts of Baía de Lourenço Marques, and reliance should not be placed on positions obtained by the magnetic compass, positions obtained by angles being preferable. *See* also caution on page 30.

Directions.—Vessels from southward should round Cabo da Inhaca at a distance of about 2 miles whence course may be shaped for the pilot vessel. Vessels should then steer 322½° on the alignment astern of the two leading light-structures on Cabo da Inhaca, keeping the two light-buoys close aboard on their port side, until about 7 cables north-north-eastward of Farol de Vasconcelos e Sá. Care should be taken to keep a safe distance from this light-structure, allowance being made as necessary for the tidal stream, which sets obliquely across Canal do Sul. The two light-buoys marking Canal do Sul are moved as the bar changes (*see* page 198).

As No. 3 light-buoy (page 201) comes into line with Baixo Ribeiro light-structure, bearing about 249°, course may be altered south-westward, and from this position, there is a choice of proceeding by Passagem do Norte, which is the most direct route and that which is usually taken by the pilots, or by Passagem do Sul.

Vessels should steer to pass southward of No. 3 light-buoy, and if proceeding by Passagem do Norte, steer about 252°, passing about 3 cables southward of Baixo Ribeiro light-structure, to the anchorage, about 2 miles eastward of Restinga da Xefina light-structure.

Charts 2089, 648, 596, 597, 748a, 2483.

Chart 644.

Vessels proceeding to Lourenço Marques should, after passing Baixo Ribeiro light-structure, steer so as to keep Confluência light-buoy (page 202), moored about 1½ miles east-north-eastward of Restinga da Xefina light-structure, in line bearing about 257° with that light-structure until north-westward of Baixo Serra, when course may be altered direct for No. 4 light-buoy (page 204), bearing 251°.

If proceeding by Passagem do Sul, vessels should steer about 235° for about 6½ miles, until the beacon westward of Ponta Vermelha is bearing 260° and in line with the old light-tower on that point, when they may be steered for, on that bearing. This course leads between Baixo Serra and Baixo Capitania to the anchorage south-eastward of Restinga da Xefina light-structure.

Vessels from northward should pass eastward and southward of Danae shoal and should not alter course for the pilot vessel until Farol de Vasconcelos e Sá bears 282°. At night, vessels from northward should keep southward of the *red* sector of Cabo da Inhaca light, which covers Danae shoal between the bearings of 212° and 224°, until they have passed through the *red* sector of Farol de Vasconcelos e Sá, which covers Danae shoal between the bearings of 273° and 282°. When Farol de Vasconcelos e Sá has changed from *red* to *white* and is bearing more than 282°, course may be shaped for the pilot vessel (*Lat. 25° 56′ S., Long. 32° 58′ E.*).

The approach to Baía de Lourenço Marques through Canal do Norte is not recommended, as it is not buoyed, nor as far as is known, is this channel used. In order to obtain a pilot, vessels must proceed to the pilot vessel, moored close to the entrance to Canal do Sul.

The following directions for Canal do Norte were written in 1885, but might be of use under certain circumstances :—

Chart 648.

Vessels from northward should keep at least 10 miles off the coast until Monte Cutfield bears about 315°, when it should be steered for on that bearing.

Chart 644.

When about 2½ miles from Monte Cutfield beacon, course may be gradually altered southward to bring the beacon to bear 357°, and, with the beacon astern on that bearing, course may be shaped to make good 177° until Farol de Vasconcelos e Sá bears 157°, when course may be shaped for a position about 1½ miles westward of this light. It should be borne in mind that the barracks on Black bluff, in line with Ponta dos Elefantes, bearing 157°, lead eastward of Baixo Fawn. *See* view on chart 644.

Chart 646.

Lourenço Marques harbour.—Canal da Polana.—Spoil ground.— The harbour is situated close within the mouth of Rio Espirito Santo. The town of Lourenço Marques is on the northern bank, and there is accommodation for 12 vessels of from 470 to 500 feet (143^{m}3 to 152^{m}4) in length, and 4 smaller vessels alongside Gorjão quay, which extends along the northern bank for about one mile north-westward from a camber, situated about 1½ miles westward of Ponta Vermelha (*Lat. 25° 59′ S., Long. 32° 36′ E.*).

In 1951, Gorjão quay was being extended north-westward for a distance of 1,000 feet (304^{m}8). In 1950, there were depths alongside Gorjão quay of from 30 to 40 feet (9^{m}1 to 12^{m}2). At the anchorage in

Chart 646.

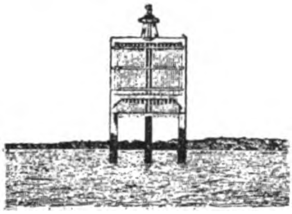
the river, there are depths of from 20 to 41 feet ($6^{m}1$ to $12^{m}5$), but the swinging space is somewhat restricted.

The City hall, a light grey stone building, with a red corrugated iron roof, situated about 3 cables north-eastward of the entrance to the camber, can be readily identified, after turning up harbour from Canal da Polana, and the Port Captain's office and the Post and Telegraphic offices, are also prominent.

Baixo da Polana, a shoal over which there is a least depth of about 9 feet ($2^{m}7$), lies across the entrance to the harbour.

A spoil ground, marked by a black, conical buoy, surmounted by a triangle, lies close eastward of Baixo da Polana and about 6 miles eastward of Ponta Vermelha.

Canal da Polana, the entrance to which, is situated about 2 miles west-south-westward of Restinga da Xefina light-structure, has been dredged across the northern side of the bar ; in 1951, there was a least depth of 24 feet ($7^{m}3$) in this channel, which has a width of 328 feet ($100^{m}0$), and is about 4 miles in length, the bottom being soft mud.


Front leading beacon, Catembe, from north-eastward.
(*Original dated* 1949.)

In 1949, a stranded wreck, situated about 1½ miles north-eastward of Restinga da Xefina light-structure, formed a prominent and useful mark for vessels outward bound through Canal da Polana.

Lights.—At Catembe, on the southern bank of Rio Espirito Santo, north-westward of Ponta Maone (*Lat. 26° 02′ S., Long. 32° 36′ E.*), there are two leading lights for use in passing through Canal da Polana. The front light is exhibited, at an elevation of 31 feet ($9^{m}4$), from a concrete pile structure, 36 feet ($11^{m}0$) in height, situated on the coastal bank about 2 miles north-westward of Ponta Maone. The rear light is exhibited, at an elevation of 100 feet ($30^{m}5$), from a white, iron tower, 39 feet ($11^{m}9$) in height, and having near it a small, white house with a red and white striped roof, situated about one mile south-westward of the front light. These two lights in line bearing 239°, lead through the centre of Canal da Polana.

Rear leading beacon, Catembe, from north-north-eastward.
(*Original dated* 1949.)

A light is exhibited, at an elevation of 30 feet ($9^{m}1$), from an iron structure, 23 feet ($7^{m}0$) in height, at the Customs landing in the camber, situated close south-eastward of Gorjão quay. It is reported that the light-structure is not easy to identify.

A light is exhibited, at an elevation of 13 feet ($4^{m}0$) from a white, concrete column on the head of a pier on the southern bank of the river, opposite Gorjão quay.

Light-buoys.—Beacons.—Canal da Polana is marked as follows :—

No. 4 light-buoy, painted red and exhibiting a *red flashing* light *every four seconds*, is moored on the southern side of the channel, about 2¼ miles south-westward of Restinga da Xefina light-structure.

No. 5 light-buoy, painted black and exhibiting a *green flashing* light *every four seconds*, is moored on the northern side of the channel, nearly 3 miles south-westward of Restinga da Xefina light-structure.

Charts 644, 2089, 648, 596, 597, 748a, 2483.

Chart 646.

No. 6 light-buoy, painted red and exhibiting a *red flashing* light *every four seconds*, is moored on the southern side of the channel, nearly 2 miles north-eastward of Ponta Vermelha.

No. 7 light-buoy, painted black and exhibiting a *green flashing* light *every four seconds*, is moored on the northern side of the channel, about one mile north-eastward of Ponta Vermelha.

No. 8 light-buoy, painted red and exhibiting a *red flashing* light *every four seconds*, is moored on the southern side of the channel, about 4 cables south-eastward of Ponta Vermelha.

No. 9 light-buoy, painted black and exhibiting a *green flashing* light *every second*, is moored on the northern side of the channel at its south-western entrance, about half a mile, south-westward of Ponta Vermelha (*Lat. 25° 59′ S., Long. 32° 36′ E.*).

Three white, triangular beacons are situated on each side of the central leading marks, which, when in line, indicate the northern and southern limits of the dredged channel.

Signal station.—Signals.—There is a signal station at Ponta Vermelha (*Lat. 25° 59′ S., Long. 32° 36′ E.*) ; vessels requiring pratique should show a *green* light when passing Ponta Vermelha at night, *see* also page 199. Vessels wishing to communicate with the shore should do so by radio and not by flashing lamp.

The following special signals are for use by vessels after having entered the harbour :—

Flags by day	*Lights by night*	*Signification*
S	One flash signal	Vessel requires pilot
T	Two *red* lights, disposed vertically, exhibited from the mast	Vessel will anchor for a period and will require berth afterwards
D	One *red* light, exhibited from the mast	Vessel requires a berth
N	—	Vessel does not require a berth
R	—	Vessel requires a tug
H	—	Vessel requires water
Q	One *green* light, exhibited from the mast	Vessel requires medical assistance

Pilots.—Port regulations.—Pilotage is compulsory for merchant vessels, *see* also page 199.

Special regulations are in force for vessels berthing alongside Gorjão quay ; a copy of these regulations should be obtained from the Port Authority.

Anchorages.—Prohibited anchorage.—Good anchorage may be obtained in depths of from 36 to 43 feet ($11^{m}0$ to $13^{m}1$), with the light-structure at the camber entrance bearing 350°, distant about 4 cables ; also in depths of from 19 to 24 feet ($5^{m}8$ to $7^{m}3$), below No. 9 light-buoy, south-eastward of the leading line for Canal da Polana.

Vessels carrying explosives proceed up river to an anchorage near the entrance to Rio Matola, about 5 miles above the town.

Anchorage is prohibited in the river north-westward of a line passing

Charts 644, 2089, 648, 596, 597, 748a, 2483.

through the positions of the Cathedral and the Tide Gauge, except as instructed by a pilot.

Directions.—From the anchorages eastward and south-eastward of Restinga da Xefina light-structure, vessels should steer for No. 4 light-buoy until the Catembe leading light-structures are in line, bearing 239°, when they should be steered for on that bearing, passing between the light-buoys.

Port facilities.—Gorjão quay (*Lat. 25° 58′ S., Long. 32° 34′ E.*), which, with the new extension is about 1¼ miles in length, is connected to the general railway system. There is a crane with a lifting capacity of 80 tons and two cranes of 10 tons. In addition there are numerous cranes of between 3 and 5 tons and twelve 2½-ton mobile cranes. The quay, which can berth 12 large vessels and 4 coasters, is equipped with 14 large sheds and berths alongside are distinguished by letters inscribed on them, extending from A to O in a north-westerly direction. A camber, in which is the entrance to the dry dock, is situated close eastward of Gorjão quay and there is a fishing-boat harbour close westward of Ponta Vermelha. There is a pier on the southern side of the river opposite the camber.

There are five ocean-going tugs and four smaller ones, of which two are equipped with fire appliances.

The dry dock is capable of taking vessels up to 1,200 tons. For details, *see* Appendix II. There is a small slipway at the south-eastern end of Gorjão quay, which can be used for launches and small craft.

Supplies.—Large stocks of coal are maintained. Coal can be taken in alongside Gorjão quay between berths M and Q with two modern coaling plants, each capable of loading 500 tons per hour. No supplies are available at the anchorages.

Fuel oil is available at the quay.

There is a tanker berth at the north-western end of Gorjão quay; another tanker berth is situated at Matola, about 4 miles higher up the river, with a length of 538 feet (164^{m}6), and a depth of 31 feet (9^{m}4) alongside.

Drinking and boiler water are laid on to Gorjão quay (*Lat. 25° 58′ S., Long. 32° 34′ E.*) and can be supplied to vessels at the anchorage by water-boat.

Fresh provisions are fairly plentiful.

Town.—Lourenço Marques is the seat of the Government General of the colony of Moçambique (Portuguese East Africa); British Consular officers are resident here.

There is a military and civil hospital with several beds, and an English nursing home.

In 1945, the population of Lourenço Marques was 69,861.

During the year 1934, a total of 825 vessels, with an aggregate tonnage of 4,458,146 tons, visited the port; of these, 417 with an aggregate tonnage of 2,492,626 tons, were British.

Health.—The climate is very pleasant from June to October but the other months contrast unfavourably with this period, as typhoid fever is then more or less prevalent. Recent improvements in filling in the swamps, reclaiming the foreshore, draining and road making, together with the abundant supply of pure water, are reported to have improved considerably the health of the town.

Weather forecasts.—Information regarding the probable weather

Chart 646.

likely to be experienced in the Moçambique channel, can be obtained at the Port office.

Deratisation.—*See* page 38.

Communications.—Lourenço Marques is connected to the general railway and telegraphic system of the Union of South Africa and there is regular communication, both by sea and by air, with other ports on the east coast of Africa and with Europe.

There is a radio station at Lourenço Marques. *See* page 35.

Time signal.—A time signal is exhibited, from the top of the eastern Customs shed on Gorjão quay. For details, *see* Admiralty List of Lights, Fog Signals and Visual Time Signals, Volume 10.

Climatic table.—*See* page 71.

Charts 646, 644.

Upper part of Rio Espirito Santo.—Buoys.—Beacons.—From the north-western end of Gorjão quay the river trends west-north-westward for about 1¾ miles, thence west-south-westward for 1¾ miles to Matola oiling wharf, and thence south-westward for 1¼ miles to meet the tributaries, Rio Tembe, Rio Umbeluzi and Rio Matola, about 6 miles above the town of Lourenço Marques.

The depths in the river decrease from 12 fathoms ($22^{m}0$) off the north-western end of Gorjão quay to 14 feet ($4^{m}3$) near its head, abreast the mouth of Rio Matola.

No. 10 conical buoy, painted red and surmounted by a cylindrical topmark, is moored about 2 miles north-westward of Ponta Chaluquene (*Lat. 25° 58′ S., Long. 32° 33′ E.*) ; No. 12 conical buoy, painted red and surmounted by a cylindrical topmark, is moored about 2 cables westward of No. 10 buoy. These buoys mark the turn in the channel. The river is dredged to a depth of 27 feet ($8^{m}2$) from a position about 1½ miles north-westward of Ponta Chaluquene to within about one mile of Matola oil wharf. From the end of the dredged channel to the oil wharf, the depths are generally greater than 6 fathoms ($11^{m}0$).

A beacon is situated about 1¾ miles north-north-westward of Ponta Chaluquene and another beacon, with a triangular topmark, stands about half a mile west-south-westward of the former.

Directions.—From the vicinity of Gorjão quay vessels should steer to bring the north-eastern corner of the Cold Store, at the north-western end of Gorjão quay, in line with the old observatory on Ponta Vermelha, astern bearing 116½°. This line leads through the dredged channel as far as No. 10 buoy, when course should be altered to 274° until abreast No. 12 buoy. The beacons mentioned above should then be brought into line astern bearing 069½° and this course leads through the dredged channel to Matola oil wharf (*Lat. 25° 58′ S., Long. 32° 30′ E.*).

The head of the oil wharf is about 180 feet ($54^{m}9$) in length, with two dolphin moorings, and tankers, drawing up to 30 feet ($9^{m}1$), can berth there.

Tributaries of Rio Espirito Santo.—In 1900, the following report on navigation in the tributaries was received :—

Rio Tembe, the southernmost tributary, was navigable for vessels of a draught of 6 feet ($1^{m}8$) for 20 miles above its mouth, but care was necessary, as the river was very narrow and tortuous.

Rio Umbeluzi the middle tributary, was navigable for vessels of a draught of 6 feet ($1^{m}8$) for about 6 or 7 miles above its mouth, at

Charts 2089, 648, 596, 597, 748a, 2483.

Charts 646, 644.

which point a bridge spans the river; above the bridge, navigation was confined to boats.

Rio Matola was only navigable for a short distance above its mouth for vessels of a draught of 4 feet ($1^{m}2$).

Chart 644.

Portinho da Inhaca.—This port is situated between the drying bank southward of Ilha dos Portugueses and Baixo Chaimite, a narrow shoal over which there is a least depth of one foot ($0^{m}3$), and which extends southward from a position about half a mile southward of Ponta dos Elefantes (*Lat. 25° 58′ S., Long. 32° 54′ E.*). The anchorage has depths of from 8 to 10 fathoms ($14^{m}6$ to $18^{m}2$), but is only two cables in width. It affords good shelter from all winds except those from the south-westward which raise a sea.

Local knowledge is required to take up a berth in this anchorage, owing to the shifting nature of the shoals in the vicinity.

Baía de Machangulo.—The approach to this bay is obstructed by shoals through which there are three channels. Canal da Inhaca, the easternmost channel, is approached through Portinho da Inhaca, and has a least charted depth of 18 feet ($5^{m}5$); Canal Direito, the middle channel, has about the same depth, but both these channels cross a bar with a least depth of 8 feet ($2^{m}4$) at their inner end. Canal Grande do Machangulo, the westernmost channel, divides about 5 miles within its entrance. The eastern branch has a least depth of 19 feet ($5^{m}8$), but is much obstructed by a bank with only 4 feet ($1^{m}2$) over it. The western branch has a least depth of 22 feet ($6^{m}7$) as far as the bar at its southern end, which has a least depth of 3 to 7 feet ($0^{m}9$ to $2^{m}1$).

Anchorage may be obtained in depths of 38 feet ($11^{m}6$) in a narrow area near the head of Baía de Machangulo.

Canal do Maputo.—Buoys.—Tidal stream.—Rio Maputo flows into the south-western corner of Baía de Lourenço Marques, and is approached through Canal do Rio Maputo, the entrance to the latter lying between Esparcelado de Oeste, the bank extending eastward of Ponta Maone, and Grande esparcelado do Maputo. Canal do Rio Maputo has a least charted depth of 19 feet ($5^{m}8$), but there is a bar with a least charted depth of 12 feet ($3^{m}7$) across the mouth of Rio Maputo. No recent information is available as to the extent of navigation possible above the bar of Rio Maputo, but in 1822 the river was reported to be navigable for small craft for over 100 miles above the bar.

No. 2 black, conical buoy, surmounted by a triangle, is moored about 2 miles eastward of Ponta Maone.

No. 4 black, conical buoy, surmounted by a triangle, is moored about 4½ miles south-eastward of Ponta Maone. These buoys mark the western side of the entrance to Canal do Rio Maputo.

No. 1 black, conical buoy, surmounted by a triangle, is moored about 1½ miles eastward of Ponta das Tres Marias and marks the eastern side of Canal do Rio Maputo.

No. 6 black, conical buoy, surmounted by a triangle, is moored about 2 miles south-eastward of Ponta das Tres Marias.

No. 8 black, conical buoy, surmounted by a triangle, is moored about three-quarters of a mile southward of No. 6 buoy.

No. 3 black, conical buoy, surmounted by a triangle, is moored at the entrance to Rio Maputo, and about 3½ miles south-south-eastward of Ponta das Tres Marias.

Charts 2089, 648, 596, 597, 748a, 2483.

Chart 644.

The out-going tidal stream runs strongly at the entrance to Rio Maputo with a velocity at times of from 2½ to 5 knots.

Rio Incomati.—Buoys.—Rio Incomati enters the sea through three channels. The northern one, passing over a bar east-south-eastward of Ponta Macaneta, has a least depth of 5 feet (1^m5). The middle channel lies between Xefina do Meio and Ilha Xefina Grande. It is much encumbered by sandbanks and has a least depth of one foot (0^m3). The southern channel lies between Restinga da Xefina light-structure and the spit off the southern end of Ilha Xefina Grande, and is only one cable in width. This channel, known as Canal da Xefina, which has a least depth of 4 feet (1^m2), passes southward and westward of Ilha Xefina Grande, and joins the middle channel about half a mile south-south-westward of Xefina do Meio (*Lat. 25° 53′ S., Long. 32° 43′ E.*).

No. 2 black, conical buoy, surmounted by a triangle, is moored about 1¾ miles northward of Restinga da Xefina light-structure and marks the eastern side of Canal da Xefina.

A red, conical buoy, surmounted by a triangle, is moored close westward of the southern extreme of Xefina do Meio, and a similar buoy is moored about half a mile south-south-westward.

The northern channel is marked by buoys.

In 1900, it was reported that Rio Incomati was navigable by steam vessels of a draught of 3½ feet (1^m0) as far as Manicho, about 40 miles above the entrance, but that the navigation of the river was intricate, especially close within the entrance, vessels frequently grounding before passing Ilha Xefina Pequena.

Chart 648.

MONTE CUTFIELD TO PONTA DA BARRA.—Coast.—Beacons.—Off-lying dangers.—Between the coast eastward of Monte Cutfield, *see* page 197, and the mouth of Lagoa river, about 26 miles north-eastward, the coast consists of bare sandhills and ridges within which may be seen some grassy hills with trees and bushes on them ; in the vicinity of the mouth of Lagoa river and on the coast eastward of it, the sand is of a more reddish colour than that visible nearer Baía de Lourenço Marques.

About 17 miles north-eastward of Monte Cutfield, there is a long, bare ridge of sand, 290 feet (88^m4) high, in the middle of which are four small sand cones, somewhat resembling bell tents ; other similar sand cones may be seen within 2 miles, and these cones form a peculiarity of this part of the coast. From a position abreast this sand ridge, about 4 miles from the coast, Monte Cutfield may be seen on a clear day, and it appears as if above a promontory. In the morning, the light streak of sand along its right hand slope, *see* page 197, would be visible, and in the afternoon, the apparent promontory below it, would be seen.

Lagoa river is the name given to the outlet of Lago Huendje, which lies about a mile within the coast. The western side of its entrance is low and sandy, and close to it is a dark and rocky bluff, 245 feet (74^m7) high, which projects from a bare sandhill and has a ledge of dark rocks at its base. When seen from close inshore, it has a very irregular and broken-up appearance, and there are several other small cliffs of a similar nature, in the vicinity. *See* view facing page 201.

Charts 2089, 596, 597, 748a, 2483.

Chart 648.

During the survey of the coast in 1884, the river entrance, across which the sea broke heavily, was very narrow at half tide, but a large extent of sand appeared to be covered at high water.

At Mabjechine, about 5½ miles north-north-eastward of Monte Cutfield and 2¾ miles inland, there is a beacon on a hill, 235 feet (71^{m}6) high.

Near Mabamba, about 16 miles north-eastward of Monte Cutfield, a white masonry beacon, surmounted by a white cylinder, stands on the bare sand ridge, mentioned above.

Several shoals, with depths of from 3¾ to 5 fathoms (6^{m}9 to 9^{m}1) over them, fringe the coast between Mabjechine and Mabamba beacons, and lie as much as 5 miles offshore in places; the bottom in this vicinity is generally sand with occasional rock, and heavy tide rips have been seen, possibly caused by the irregular depths.

Lagoa shoal, a narrow ridge of rock and sand, with a least depth of 2¼ fathoms (4^{m}1) over it, lies about 4 miles offshore, between Mabamba beacon and the mouth of Lagoa river (*Lat. 25° 20′ S., Long. 33° 15′ E.*).

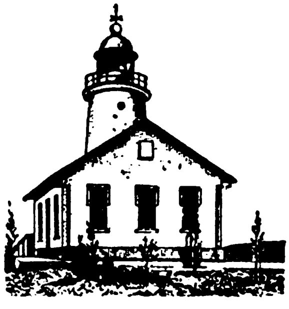
Between the mouths of Lagoa river and Rio Limpopo, about 16 miles north-eastward, the coastal hills are moderately bare and of a light colour for the first 10 miles, but they then become darker and increase in height; about 4½ miles north-eastward of the mouth of Lagoa river, a rocky point projects from the base of the sandhills close to high water mark, and forms a small cliff, about 12 feet (3^{m}7) high. Monte Nouvela, 413 feet (125^{m}9) high, and covered with dark bush, lies about 11½ miles north-eastward of the mouth of the Lagoa river.

A detached shoal, over which there is a depth of 3½ fathoms (6^{m}4), lies one mile offshore, about 9 miles north-eastward of the mouth of Lagoa river.

Charts 685 (plan of Limpopo River Entrance), 648.

Rio Limpopo.—Light.—Beacon.—Off-lying dangers.—Rio Limpopo, also known as Rio Inhampura, has a bar across its entrance, the depths over which are subject to considerable changes, and are reported to vary from year to year as well as during the different seasons. As little as 2 feet (0^{m}6) on the bar has been reported, but in 1945, there was a depth of 8 feet (2^{m}4). Within the bar the river deepens, and it is reported to be navigable for a considerable distance by light-draught power vessels, even in the dry season.

The entrance is well defined, a conspicuous red-topped hill may be seen over it, about a mile inland, and the land westward appears fertile and well cultivated; eastward of the entrance, the coast is bare and sandy with occasional bushy sandhills, among which may be seen a wooded round-topped hill. Ponta Chai-Chai, the eastern entrance point, is a low sand spit, on which there are a few bushes; at Ponta Maquitane, the western entrance point, the coast appears to curve round into the river.



Monte Belo lighthouse from north-westward.
(*Original dated* 1949.)

A light is exhibited, at an elevation of 301 feet (91^{m}7), from a masonry tower, 46 feet (14^{m}0) in height, on a building situated on Monte Belo, a hill about 1½ miles north-westward of Ponta Maquitane.

Charts 596, 597, 748a, 2483.

Charts 685 (plan of Limpopo River Entrance), 648.

A white masonry beacon, surmounted by a white cylinder, 16 feet (4m9) in height, stands on a sandhill, 430 feet (131m1) high, about 2½ miles north-westward of Monte Belo.

Baixos de Inhampura consist of two shoals, which are situated one on either side of the entrance to the river. On the western side of the entrance is Baixo do Sul, a narrow, rocky shoal, with a least depth of 3½ fathoms (6m4) over it, which lies parallel with the coast, its eastern edge being about 1½ miles southward of the mouth of Rio Limpopo.

The western edge of Baixo de Leste lies about 4 miles eastward of Rio Limpopo entrance, and the shoal extends parallel with the coast for about 10 miles; it is only about one cable in width, consists of stones, and has a least depth of 4½ feet (1m3). Baixo de Leste is steep-to on both sides, especially so on its inshore side; the sea breaks over it in places during southerly and south-easterly winds.

Entrance channel.—Beacons.—Buoys.—Banco do Norte, which fringes Ponta Chai-Chai, and Banco do Sul, which extends eastward for nearly 5 cables from Ponta Maquitane, contract the navigable channel to a width of about one cable at the entrance. The bar, which is about a cable wide, lies between the southern side of Banco do Norte and the eastern extreme of Banco do Sul. Breakers extend about 3 miles seaward of the bar.

A bank, which partially dries, extends westward from Ponta Chai-Chai, and reduces the width of the navigable channel close northward of Ponta Maquitane to little more than half a cable. Banco Limpopo, which also partially dries, lies in the middle of the river northward of Ponta Chai-Chai; the channel passes eastward of Banco Limpopo.

Leading beacons are erected on the western side of the entrance to indicate the channel across the bar.

The channel between the bar and the northern end of Banco Limpopo, is marked in places by buoys.

Chart 685 (plan of Limpopo River Entrance).

Tidal stream.—The out-going tidal stream at times attains a velocity of 4 knots, and may exceed this rate after rains; discoloured water from the river may extend 3 or 4 miles seaward of the entrance.

Chart 648.

Communications.—There is regular communication by sea between Lourenço Marques and Vila de João Belo, the principal town of the district, which is situated about 20 miles by river above the mouth of Rio Limpopo (*Lat. 25° 13′ S., Long. 33° 31′ E.*).

Coast.—Landmarks and beacons.—Light.—Between Ponta Chai-Chai and Ponta Závora, about 103 miles east-north-eastward, the coast consists of a line of sandy hills covered with vegetation which gives them a dark appearance. In places, the hills are bare, forming gaps in the dark line of vegetation which can be seen from a considerable distance.

About 4 miles north-eastward of Ponta Chai-Chai, there is a bare hill, 282 feet (86m0) high, with vegetation on its summit; it is considerably higher than the surrounding country and may be readily identified.

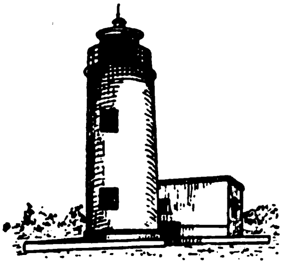
Kaixaventuane, a hill, 365 feet (111m2) high, about 16½ miles north-eastward of Ponta Chai-Chai, has on its summit a beacon, which, however, is only visible from a distance of about 2 miles, but it may

Charts 596, 597, 748a, 2483.

Chart 648.

be identified by a mark on a hill close south-westward of it; when seen from south-westward, the mark resembles a sandy patch on the summit, but when seen from north-eastward, it appears as a reddish streak which extends from the base to the summit, and can be seen from a considerable distance.

About 29 miles north-eastward of Ponta Chai-Chai, there is a broad band of white sand with a small dark hill in its centre; between this sandy band and the beach there are some small sand dunes covered with vegetation, and close south-westward of the patch, two sandy streaks extend right down to the beach.



Boa Paz lighthouse.
(*Original dated* 1949.)

A light, known as Boa Paz, is exhibited, at an elevation of 239 feet ($72^{m}8$), from a white, circular, concrete tower, 26 feet ($7^{m}9$) in height, about 38½ miles east-north-eastward of Ponta Chai-Chai.

Txibange, a hill, 479 feet ($146^{m}0$) high, about 49 miles north-eastward of Ponta Chai-Chai and about 5 miles inland, is part of an extensive range. There is a beacon on it, but the beacon is difficult to distinguish as it is fixed to a tree, the top of which is higher than the beacon; the tree, however, has the appearance of a raised, rectangular, wooden frame, and may be identified from a distance of 10 miles. There is another prominent but darker tree northward of that to which the beacon is attached.

Aguada da Boa Paz, about 53 miles north-eastward of Ponta Chai-Chai, is the outlet of Lagoa Inhapavala (Laguna Inhapanvale), and also of a chain of lakes which extend north-eastward a short distance within the coast and terminate at Lagoa Poelela, about 40 miles further north-eastward.

A chain of rocks, on which the sea always breaks, fronts the bar across Aguada da Boa Paz, and renders entry impracticable to all vessels.

At 6 miles from the coast, the entrance may readily be identified by a chain of small hills westward of it, which ends in a hill, 66 feet ($20^{m}1$) high, which dips to the river mouth in a steep reddish slope. At this distance, the break in the coastline can be seen, and, at low water, an unbroken bank of sand appears to extend across the entrance, the outfall being invisible, while the gap in the coastline is backed by the dark line of vegetation on the high ground inland. North-eastward of the entrance, the land near the coast is level.

Danger.—Offshore depths.—Baixos da Boa Paz is a bank of stones which extends eastward along the coast from a point about 15 miles south-westward of Aguada da Boa Paz. The bank forks about 8 miles eastward of its commencement and one part extends away from the coast, its eastern end being nearly 3 miles offshore. The last 4 miles of this part, over which there is a least depth of 4½ feet ($1^{m}3$), is very dangerous, as it does not break; on the western part of the bank, the sea breaks on the rocks up to one mile from the coast.

Between the mouth of Rio Limpopo and Aguada da Boa Paz (*Lat. 24° 53′ S., Long. 34° 26′ E.*), depths of 20 fathoms ($36^{m}6$) are found at a fairly constant distance of 3 to 4 miles from the coast, except at the

Charts 596, 597, 748a, 2483.

Chart 648.

south-western end of Baixos da Boa Paz, where depths of 20 fathoms ($36^{m}6$) are found within about a mile of the coast for a short distance.

Coast.—Lights.—Signal station.—Danger.—About 4½ miles north-eastward of Aguada da Boa Paz, there is a hill somewhat higher than the surrounding country, whose upper part resembles a round plateau, and, except for a bare patch on its south-western side, is covered with vegetation. There is a ridge of rocks on its summit, and the bare patch is very distinct in certain lights, and may be seen from as much as 12 miles distant. When viewed from a position close inshore, the coast abreast this hill, gives the impression of being the entrance to a small bay.

Inhagotou is a hill, 548 feet ($167^{m}0$) high, about 15½ miles north-eastward of Aguada da Boa Paz, and has on its summit a beacon, consisting of a mast, surmounted by a wooden triangle ; about 8 miles eastward of Inhagotou, on the slopes of a coastal hill, 249 feet ($75^{m}9$) high, there are two deep yellow streaks, which can be seen from a considerable distance.

A light, known as Quissicö light, is exhibited, at an elevation of 183 feet ($55^{m}8$), from a white, square, framework concrete tower, 20 feet ($6^{m}1$) in height, situated on the coast about 7 miles eastward of Inhagotou.

Inhabucula, 634 feet ($193^{m}2$) high, and Chepuala, 600 feet ($182^{m}9$) high, are two hills, about 13 and 11 miles, respectively, south-westward of Ponta Závora, and both have beacons on them ; these beacons may be distinguished when close inshore, but the hills are not otherwise conspicuous.

Quissicö light.
(*Original dated* 1949.)

Ponta Závora is fringed with above-water rocks, and close within the point, a ridge of sandhills rises to an elevation of from 200 to 300 feet ($61^{m}0$ to $91^{m}4$) ; the point itself is not conspicuous, but about 1¾ miles northward of it there is a prominent sand-cliff, nearly half a mile in length.

A light is exhibited, at an elevation of 216 feet ($65^{m}8$), from a white, masonry tower, 54 feet ($16^{m}5$) in height, close to a building, situated on a sandhill near Ponta Závora (*Lat. 24° 31′ S., Long. 35° 12′ E.*).

A signal station is situated at the lighthouse.

Close northward of Ponta Závora there is a slight indentation in the coast, in which shelter from south-westerly winds might be obtanied.

A rock, with less than 6 feet ($1^{m}8$) over it, was, in 1953, reported to exist about 5¾ miles east-north-eastward of Ponta Závora light.

Ponta Závora lighthouse from south-eastward.
(*Original dated* 1949.)

There are no off-lying dangers between Aguada da Boa Paz and Ponta Závora ; a few rocks fringe the coast in places, mostly abreast the points, but nowhere extend more than 1½ cables offshore.

Currents.—The following is a summary of the observations made

Charts 596, 597, 748a, 2483.

Chart 648.

over a period of 10 months, by the Portuguese gunboat *Pembane*, when cruising between Rio Limpopo and Ponta Závora:—

Within about 10 miles of the coast there is little or no current. Farther out, the south-westerly current is felt, getting stronger as the distance from the coast is increased. It was also noticed that this current conformed in direction with the current off Cabo das Correntes; thus, if the current off Cabo das Correntes was setting parallel with the coast, it was certain to be setting parallel with the coast along the edge of the offshore bank between Aguada da Boa Paz and Ponta Závora, and, if it was found to be setting towards the coast off Cabo das Correntes, it was certain to be found setting towards the coast along the edge of the above-named offshore bank. During southerly gales, a set towards the coast must be expected.

Coast.—Light.—Between Ponta Závora and Cabo das Correntes (*Lat. 24° 07′ S., Long. 35° 30′ E.*), about 31 miles north-north-eastward, the hills rise to an elevation of over 600 feet (182^{m}9), from 2 to 4 miles inland, and are partially cultivated. The coast from Ponta Závora for about 8½ miles northward, is fringed with rocky patches, and, about 22 miles northward of Ponta Závora, there is a rocky reef which extends nearly half a mile offshore. Heavy breakers have been seen along this part of the coast, at a distance of about 3 miles offshore.

Inhatumungue, 436 feet (132^{m}9) high, is a hill situated about 3 miles northward of Ponta Závora; it may be identified by an isolated clump of trees on another hill directly north-eastward of it, which clump may be seen from a distance of over 20 miles in clear weather.

Another clump, which is dark in colour and in which the trees resemble firs, is situated on the coastal sandhills about 15 miles northward of Ponta Závora; the clump is prominent and is the only one in the locality.

Cabo das Correntes, the western extremity of the southern end of the Moçambique channel, is a rounded sandy point, partially covered with bushes, within which the land rises to an elevation of 361 feet (110^{m}0), the coast on either side of the cape being slightly higher. The cape may be identified by a few black, detached rocks, which fringe it, and also by an islet, 15 feet (4^{m}6) high, which is situated about 2½ miles south-south-westward of the cape and which is connected to the coast by a rocky reef. The coast adjacent to Cabo das Correntes is bold, and may be approached within a mile with safety.

A light is exhibited, at an elevation of 70 feet (21^{m}3), from a square, framework, concrete tower, 10 feet (3^{m}0) in height, situated close within Cabo das Correntes (*Lat. 24° 07′ S., Long. 35° 30′ E.*).

Between Cabo das Correntes and Cabo Inhambane, about 15 miles northward, the coast consists of a sandy beach which is backed by high sandhills which, when seen from some distance, resemble chalky cliffs, and on which the only sign of cultivation is on a round-topped hill, standing a little distance within the coast about 7 miles northward of Cabo das Correntes. Gumula, a hill, 426 feet (129^{m}8) high, on the summit of which is a surveying beacon, is situated about 5 miles northward of Cabo das Correntes; nearly abreast Gumula, there is a small projection of the coast, known as Ponta Gumula, which is fringed with rocks and makes a break in the sandy beach.

Cabo Inhambane is a small rocky point, close within which is a conical hill, 200 feet (61^{m}0) high, which is grassy and nearly free of

Charts 596, 597, 748a, 2483.

Chart 648.

bush ; about one mile northward of the cape is a small rocky point, fringed with a reef which extends about 3 cables offshore.

Depths of 20 fathoms ($36^{m}6$) are found at a fairly constant distance of a little over a mile from the coast between Cabo das Correntes and Cabo Inhambane, and anchorage may be obtained in depths of from 15 to 20 fathoms ($27^{m}4$ to $36^{m}6$) at nearly one mile offshore between these points.

Chart 650.

Ponta da Barra.—Light.—Signal station.—Beacon.—Ponta da Barra lies about 4 miles northward of Cabo Inhambane and is low, but the land within the point rises to an elevation of 230 feet ($70^{m}1$) at Conhame (Barrow hill), about one mile westward of the point ; this hill has a sharp summit with a clump of trees on it, and it is readily identified from northward.

A light is exhibited, at an elevation of 80 feet ($24^{m}4$), from a white, masonry tower, 44 feet ($13^{m}4$) in height, situated on a hill close within Ponta da Barra.

A signal station, with which vessels can communicate by the International Code of Signals, and which is in communication with the town of Inhambane, is situated near the lighthouse.

Ponta da Barra lighthouse from northward.
(*Original dated* 1949.)

A black, pyramidal beacon, about 19 feet ($5^{m}8$) in height, stands on Conhame.

Chart 648.

Currents.—The following is a summary of a report, made in 1884 by H.M.S. *Sylvia,* when surveying the coast between Ponta Závora and Ponta da Barra :—

The prevailing winds apparently have a great effect on the current, at any rate within a few miles of the coast, and, as the wind generally blows along the coast, the current varies with it, either northerly or southerly. Except in the vicinity of the mouths of rivers, no current was observed to be setting onshore or offshore during the survey, but see page 214 and H.M.S. *Astraea's* report below. The strongest current observed was off Cabo das Correntes, where, during the short stay of H.M.S. *Sylvia,* in December, 1884, a constant southerly set, with a velocity of about 3 knots, was observed in a position 1½ miles offshore, abreast the cape ; within one mile of the coast, about 6 miles southward of the cape, there was no current, and at 1½ miles offshore, at 14 miles southward of the cape, a northerly set, with a velocity of about one knot, was observed. Northward of the cape, and between it and Ponta da Barra, the current sometimes was strong, even within a mile of the coast. The southerly set would appear to be deflected after passing Cabo das Correntes, as it was found to be considerably weaker off Ponta Závora.

In 1914, H.M.S. *Astraea* experienced a slight indraught between Baía de Lourenço Marques and Ponta Závora (*Lat. 24° 32′ S., Long. 35° 12′ E.*), and, later in the same year, being southward of Ponta Závora on passage to Durban, she experienced, during a heavy gale, a set of 17 miles about 240°, or towards the coast, in a run of 23 hours ; this was probably caused by the gale.

Charts 596, 597, 748a, 2483.

CHAPTER VI

MOÇAMBIQUE CHANNEL—PONTA DA BARRA TO PONTA TANGALANE

Chart 650, plan of Rio Inhambane

PONTA DA BARRA TO PONTA MACIQUE.—Baía de Inhambane.—Baía de Inhambane is entered between Ponta da Barra and Ponta Algoa, about 9½ miles north-westward; it is almost completely obstructed by banks and breaking reefs which dry in places. Rio Inhambane flows close to the western shore of the bay and enters the sea across two bars, the outer one of which is situated about 3 miles east-south-eastward of Ponta Algoa, forming a narrow channel in which vessels that can cross the bars can proceed to an anchorage abreast the town of Inhambane, about 10 miles west-south-westward of Ponta da Barra, on the eastern bank of Rio Inhambane.

Southern shore of bay.—Between Ponta da Barra (*Lat. 23° 47′ S., Long. 35° 32′ E.*) and Barrow point, a low sandy point about 2¾ miles westward, the coast is very low and is covered with mangroves in places. Ponta da Barra is fringed with a rocky reef, which extends nearly half a mile north-eastward of it and there are other rocky patches about one mile farther westward and about the same distance offshore.

The area between Barrow point and Ponta de Mocucuni the north-western extreme of a low, sandy and partly wooded peninsula about 7 miles south-westward, is completely filled with a bank which dries in places and which has boat channels through it. This bank extends over 11 miles from the head of the bay and about 6 miles northward of Barrow point, and on the bank are two islands, Ilha dos Ratos and Ilha dos Porcos, about 2½ and 3½ miles, respectively, north-eastward of Ponta de Mocucuni. Both islands are low, flat and covered with coconut palms, and on the south-eastern extreme of Ilha dos Porcos, is a signal station and flagstaff which transmits messages from Ponta da Barra signal station to the town of Inhambane.

Between Ponta de Mocucuni and Ponta Belan, about 1¼ miles southward, there is a small bay which is completely filled by a drying bank. Ponta Belan is the north-western extreme of a small peninsula on which stands the town of Inhambane. The town is surrounded by coconut palms, and is not easily seen until close-to; two framework radio masts are situated about 3 cables southward of Ponta Belan, near the root of Inhambane pier.

Western shore of bay.—Between Ponta Algoa (*Lat. 23° 40′ S., Long. 35° 26′ E.*) and Ponta da Linga-Linga, about 4½ miles southward, the land is flat and thickly wooded; Ponta da Linga-Linga is the southern extreme of a peninsula which forms the eastern shore

Charts 648, 596, 597, 748a, 2483.

Chart 650, plan of Rio Inhambane.

of Baía de Linga-Linga, a small land-locked bay in which small vessels may obtain anchorage in depths of 12 feet (3^m7). Ponta do Mongo lies about 2¾ miles north-north-westward of Ponta da Linga-Linga, and is the southern entrance point of the northern branch of Rio Inhambane, whence the western shore of Baía de Inhambane trends southward for about 10 miles, at which point it forms the western bank of the river opposite to, and about 1½ miles westward of Ponta Belan; Ponta Chicuque, a remarkable sandy cliff, is situated about 6 miles southward of Ponta do Mongo.

Outer anchorage.—Anchorage may be obtained in depths of from 44 to 47 feet (13^m4 to 14^m3) about 4 miles east-south-eastward of Ponta Algoa and, during strong southerly winds good shelter will be found northward of Barrow hill, 7 or 8 cables offshore; good anchorage over sand, may also be obtained about one mile off the eastern edge of the drying bank which extends northward of Barrow point.

There is nearly always a swell at these anchorages, however, and vessels should be prepared to leave them on any change of wind eastward.

Pilots.—The harbour master is the only pilot and ample notice should be given if his services are required.

Tidal streams.—The tidal streams run with a velocity of from 2 to 4 knots on the bar, and from 1½ to 2 knots at the anchorage abreast the town.

Bars.—Depth.—Light-buoy.—There are two bars in the approach, both of them subject to constant change. In 1950, the least depth on the outer bar was 15 feet (4^m6); the inner bar, the navigable channel of which is very narrow, lies about midway between the outer bar and the anchorage off the town of Inhambane.

The fairway light-buoy, a black pillar buoy painted with white stripes and surmounted by a white ball, exhibiting a *white flashing* light, showing a *short* flash *every ten seconds*, is moored about half a mile seaward of the outer bar.

Beacons.—Buoys.—Caution.—The bars and banks of the river are marked by leading beacons and buoys, which are subject to frequent change to mark the existing channel.

Owing to its changing nature, no vessel should attempt to cross the outer bar without a pilot, unless in possession of the latest local knowledge; there is always a heavy swell on the bar and, during strong south-easterly winds, the sea often breaks over it, while the outgoing tidal stream is running. In such circumstances, vessels of a draught of 10 feet (3^m0) or more, should await the in-going tidal stream before crossing the bar.

Pier.—A T-shaped pier projects into the river from Inhambane, its outer end being 379 feet (115^m5) in length, with a depth alongside of 22 feet (6^m7). H.M.S. *Wallflower* reported a strong set-off when going alongside during the period of the out-going tidal stream.

Anchorages.—The anchorage for men-of-war is northward of Casa Hollandesa, which is situated a short distance northward of the church; merchant vessels anchor southward of the man-of-war anchorage and between it and a position abreast the cemetery. The quarantine anchorage and the anchorage for vessels with explosives, is farther southward.

Charts 648, 596, 597, 748a, 2483.

Chart 650, plan of Rio Inhambane.

Supplies.—Fresh provisions can be readily obtained and water is laid on to the pier.

Town.—Inhambane (*Lat. 23° 52′ S., Long. 35° 23′ E.*) is the chief town of the district of that name, and is one of the oldest of Portuguese settlements. The principal industry in the district is agriculture, and Inhambane is the principal port of embarkation for natives for the Rand mines.

In 1940, the town had a total population of 20,464, of whom 463 were Europeans.

During the year 1933, 108 vessels of an aggregate tonnage of 140,927 tons, visited the port.

There is a hospital with several beds of which a few are available for Europeans. The town is considered to be the most healthy port in Moçambique, but fever should be guarded against from November to May.

Communications.—Inhambane has regular communication by sea with other East African ports.

A short railway line serves the immediate hinterland, and a railway which will connect Inhambane with Lourenço Marques and the African general railway system, is under construction.

There is regular communication by air between Inhambane and Lourenço Marques, Beira and Quelimane.

Inhambane is connected to the general telegraphic system.

Chart 648.

Coast.—Beacons.—Between Ponta Algoa, *see* page 216, and Ponta da Barra Falsa, about 45 miles northward, the coast is backed by hills of from 450 to 650 feet (137^m2 to 198^m1) high, and has no remarkable features until within about 10 miles of Ponta da Barra Falsa, where there is a prominent ridge of bare, reddish-coloured sand, known as Sylvia ridge, which has, at its base and close to the sea, a fringe of green bushes.

A black, pyramidal, surveying beacon, 19 feet (5^m8) in height, is situated on a hill, 522 feet (159^m1) high, in the Olenghe range, about 6 miles northward of Ponta Algoa; a similar beacon is situated on Inhamitule, a hill, 627 feet (191^m1) high, about 18 miles farther northward, but the latter beacon is not easily distinguished.

Off-lying dangers.—Between Ponta Algoa and Arnold point, about 20 miles northward, the offshore depths are regular and the bottom is sandy, but about 4 miles northward of the latter point, a bank, on which the depths are less than 10 fathoms (18^m3), and irregular, and on which the bottom is rocky, fronts the coast northward to within a few miles of Ponta da Barra Falsa, and extends offshore as much as 4 miles in places. Sylvia shoal, a narrow strip of coral, with depths of 2½ fathoms (4^m6) over it in several places, lies on the eastern edge of this rocky bank, and extends parallel with the coast for about 4½ miles, its northern edge being about 10 miles southward of Ponta da Barra Falsa (*Lat. 22° 56′ S., Long. 35°37′E.*). Depths of 20 fathoms (36^m6) are found about half a mile eastward of the centre of Sylvia shoal, but the area between the shoal and the coast has not been closely examined.

Ponta da Barra Falsa.—Light.—Ponta da Barra Falsa (*Lat. 22° 56′ S., Long. 35° 37′ E.*) is low, but the land close within it rises to two small conical sandhills, 95 feet (29^m0) high, and thence to a

Charts 596, 597, 748a, 2483.

peak, about 365 feet (111^{m}2) high, around which is a considerable amount of sand which makes it noticeable from northward. Good shelter may be obtained under the point during westerly winds, and landing might be effected at times, close north-westward of it.

A light is exhibited, at an elevation of 404 feet (123^{m}1), from a white, square, concrete tower, 46 feet (14^{m}0) in height, situated on the summit within Ponta da Barra Falsa.

Coast.—Beacons.—Light.—About 3½ miles north-westward of Ponta Barra Falsa is the entrance to Baía de Poméne, a bay which has not been closely examined. In 1884, H.M.S. *Sylvia* reported that at high water, neaps, there was apparently a boat channel in the entrance, within which the bay appeared large, and the surrounding hills, especially those north-westward, rose steeply from its shores and were partially cultivated.

About 12 miles northward of Ponta da Barra Falsa, are some remarkable reddish-coloured sandcliffs, known as the Shivala cliffs, which extend for about 2 miles northward, and reach an elevation of about 120 feet (36^{m}6); they are very prominent, especially during the forenoon.

A sandy beach extends between the Shivala cliffs and Machekâne, a hill, 416 feet (126^{m}8) high, which stands close to the coast about 12 miles northward, within which is a continuous line of small sand dunes which are partially covered with bush. On the southern part of this stretch of coast, the hills within the sand dunes are lower and more wooded than those southward of the Shivala cliffs, and about 5½ miles northward of the latter, the coast is very low and has the appearance of being the entrance to a river, but the sand dunes are continuous.

The coastal hills rise again to an elevation of about 300 feet (91^{m}4), about 10 miles northward of the Shivala cliffs, and here there are some remarkable red sandhills, with cliffs of a deeper colour in many places on their seaward slopes; these cliffs are generally about one-third up the slope of the hills, but occasionally they come down to sea level. Although the upper edge of the cliffs is perfectly even, their faces are cut up into pyramids, which somewhat resemble an encampment of bell tents.

A black, pyramidal, surveying beacon, 19 feet (5^{m}8) in height, stands on the summit of Machekâne (*Lat. 22° 32′ S., Long. 35° 30′ E.*).

Between Machekâne and the mouth of Rio Mejungo, about 14 miles northward, the coastal hills are a little over 200 feet (61^{m}0) high, and are fronted with small, white, sandhills, more or less wooded; for about 6 miles northward of the mouth of Rio Mejungo, the coast has no remarkable features, and the land gradually decreases in elevation as Cabo São Sebastião is approached, until the coastal hills cease altogether about 7 miles southward of that cape.

About 7 miles southward of Cabo São Sebastião, a remarkable sand spit, partially covered with scraggy trees and bushes, and nowhere more than half a mile in width, extends northward parallel with the high land which terminates in Cabo São Sebastião, from which it is separated by a narrow inlet in which there are very shoal depths; Ponta Chambure, its northern extreme, lies nearly 4 miles east-south-eastward of Cabo São Sebastião.

A light is exhibited at an elevation of 120 feet (36^{m}6), from a red

Chart 648.

tower on a white dwelling, 26 feet ($7^{m}9$) in height, on the southern extremity of the sand spit described above. The light is known as São Sebastião light, but is actually situated about 11 miles south-south-eastward of the cape of that name.

Chart 685, plan of Bazaruto bay.

Cabo São Sebastião is a steep bluff, about 228 feet ($69^{m}5$) high, the bluff being the northern extreme of a range of hills which extends southward for about 2 miles at the same elevation as the bluff, after which they dip for a short distance and then rise to a range of wooded hills which attains an elevation of 305 feet ($93^{m}0$), at Chikuenine, a hill about 5½ miles southward of the cape. When viewed from southward, a small, white, sand patch may be seen near the upper part of the bluff, and, when viewed from northward, a considerable amount of red sand, which extends up the face of the cliff from base to summit, is visible.

A black, pyramidal, surveying beacon, 19 feet ($5^{m}8$) in height, stands on the summit of Chikuenine (*Lat. 22° 11′ S., Long. 35° 30′ E.*).

Chart 648.

Bank.—Off-lying dangers.—A bank, on which the depths are less than 20 fathoms ($36^{m}6$), extends between 3 and 5 miles offshore, from Ponta da Barra Falsa for about 25 miles northward, whence it gradually approaches the coast to within 2 miles near the mouth of Rio Mejungo.

Zambia shoal, a bank of coral with a least depth of 3 fathoms ($5^{m}5$) over it, lies about 10 miles northward of Ponta da Barra Falsa and about 4 miles offshore; it is steep-to, especially on its eastern side.

Africa shoal, a patch of sand and rock, over which there is a least depth of 2½ fathoms ($4^{m}6$), lies about 24 miles northward of Ponta da Barra Falsa and about 2½ miles offshore; there are depths of 9 fathoms ($16^{m}5$) in the passage between Africa shoal and the coast.

A depth of 3 fathoms ($5^{m}5$), which is apparently a part of a reef extending from the coast near the mouth of Rio Mejungo, was found one mile offshore, about 38 miles northward of Ponta da Barra Falsa.

Current.—Directions.—A strong current, setting southward, is often experienced when within a mile of Ponta da Barra Falsa; north-bound vessels may avoid this current to a great extent, by keeping inside the 20-fathom ($36^{m}6$) bank, when northward of the point. A northerly set is sometimes found on this bank, the outer edge of which is often clearly defined by a line of ripples which stretches, nearly parallel with the coast, between Ponta da Barra Falsa and Cabo São Sebastião.

After passing Ponta da Barra Falsa, northward-bound vessels may shape a course along the coast at a distance offshore of about 3 miles, in depths of 7 or 8 fathoms ($12^{m}8$ or $14^{m}6$), with Ponta da Barra Falsa bearing about 159°, until the high part of Shivala cliffs bears about 311°, when course should be altered to about 000°, passing inside Zambia shoal in about the same depths. As long as the vessel is kept on the 20-fathom ($36^{m}6$) bank, the current will be found to be comparatively weak, but care is necessary to avoid Africa shoal, northward of which the edge of the bank gradually approaches the coast and passes within a mile of the foul ground off the mouth of Rio Mejungo; the coast in this vicinity should not be approached within 2 miles.

Charts 596, 597, 748a, 2483.

Chart 685, plan of Bazaruto bay.

Coast.—Light.—Beacon.—Cabo São Sebastião (*Lat. 22° 05′ S., Long. 35° 29′ E.*) is the southern entrance point of a large bay, which has not been examined and which is fronted by a continuous line of breakers which extends northward from Ponta Chambure for over 18 miles to the southern part of the coast of Ilha Bazaruto Grande. The shore at the head of the bay is low, and, being about 12 miles within the line of breakers, is indistinct from the offing, but a red cliff at the north-western corner of the bay, about 13 miles north-westward of Cabo São Sebastião, is noticeable under some conditions, especially during the forenoon.

A light, known as Mucoque light, is exhibited at an elevation of 36 feet ($11^{m}0$), from a white column on a white, square tower, the whole 15 feet ($4^{m}6$) in height, situated on Ponta Chué, about 10¼ miles west-north-westward of Cabo São Sebastião.

A black, pyramidal, surveying beacon, 19 feet ($5^{m}8$) in height, stands on Komuhine, a hill, 148 feet ($45^{m}1$) high, about 14 miles north-westward of Cabo São Sebastião.

Ilhas dos Bazarutos.—Offshore depths.—Currents.—Ilhas dos Bazarutos consists of Ilha Bazaruto Grande, Ilha Benguerua, Ilha Santa Carolina and Ilha Xezine besides some small sandy islets, and the group extends about 35 miles northward of Cabo São Sebastião to Cabo Bazaruto, the northern extreme of Ilha Bazaruto Grande. The islands are under the jurisdiction of the governor of Chiloane, and there is a settlement on Ilha Santa Carolina, but their trade is insignificant, although the locality is the site of the pearl fishery of Sofala, and pearls and mother-of-pearl are still occasionally met with.

Access to the southern islands of the group is entirely cut off from seaward by the line of breakers which extends northward from Ponta Chambure, passes some miles seaward of the islands and ceases 2 miles offshore about 4 miles northward of the southern extreme of Ilha Bazaruto Grande, whence, for about 15 miles northward to Cabo Bazaruto, there are no known off-lying dangers.

Depths of 20 fathoms ($36^{m}6$) are found from half a mile to 3 miles outside the line of breakers, and northward of them, at between one and 2 miles from the coast of Ilha Bazaruto Grande ; at some places, especially at 11 miles northward of Ponta Chambure, the depths decrease from 20 to 8 fathoms ($36^{m}6$ to $14^{m}6$), very rapidly. Depths of over 100 fathoms ($182^{m}9$), are found between 2 and 5 miles outside the line of breakers, and, northward of them, at between 3 and 4 miles offshore.

The currents run very strongly about the islands, especially in the deep water outside the eastern edge of the shore bank.

Southernmost islets and islands.—Ilha Bangué is a low sandy islet which lies nearly 3 miles northward of Cabo São Sebastião ; it has a conspicuous clump of dark trees near its centre.

Ilha Chirundira is a small, sandy islet, about 4¼ miles northward of Cabo São Sebastião (*Lat. 22° 05′ S., Long. 35° 29′ E.*).

Ilha Xezine, about 7 miles northward of Cabo São Sebastião, has some red cliffs on its southern part, except for which it is covered with trees to the high water mark.

Ilha Benguerua.—Beacon.—Boat channel.—Ilha Benguerua lies about 3 miles northward of Ilha Xezine, and is sandy and partially wooded. Near its south-eastern extreme is a reddish, sandy bluff,

Charts 648, 596, 597, 748a, 2483.

Chart 685, plan of Bazaruto bay.

and farther northward are two well-defined and partially wooded peaks, on the southern of which, at an elevation of 170 feet ($51^{m}8$) is a black, pyramidal, surveying beacon, 19 feet ($5^{m}8$) in height; northward of these peaks, the land is much lower. There are several villages on the island, and it is surrounded by drying sandbanks, on one of which, about 2 miles southward of the south-eastern extreme of the island, stands Ilha Molungú, and there is another small, sandy islet about 2 miles northward of the island, on a sandbank which has a rocky reef on its eastern side.

There is a boat channel through an opening in the line of breakers north-eastward of Ilha Benguerua, which leads southward of Ilha Bazaruto Grande to the north-western side of Ilha Benguerua.

Ilha Bazaruto Grande.—Light.—Beacon.—The southern extreme of Ilha Bazaruto Grande lies nearly 3 miles northward of Ilha Benguerua (*Lat. 21° 52′ S., Long. 35° 26′ E.*). The island is low and sparsely wooded at either end, but at 5 miles from its southern extreme it rises to a bare ridge, 370 feet ($112^{m}8$) high, which extends northward for about 12 miles at an elevation of about 300 feet ($91^{m}4$), whence it slopes down for about a mile northward to Cabo Bazaruto. Viewed from southward, the island appears bare, sandy and whale-backed. Ponta de Carlos, a narrow sandspit with some hummocks on it, projects westward about 2 miles from Cabo Bazaruto. A rocky reef fringes the coast between 2 and 3 miles south-eastward of Cabo Bazaruto, and extends as much as half a mile offshore.

Bazaruto lighthouse.
(Original dated 1949.)

A light is exhibited, at an elevation of 374 feet ($114^{m}0$), from a white, stone tower, 85 feet ($25^{m}9$) in height, with dwelling attached, situated on the summit of the ridge about 2¼ miles south-eastward of Cabo Bazaruto: there is a flagstaff near the lighthouse.

A black, pyramidal, surveying beacon, 19 feet ($5^{m}8$) in height, stands on a hill, 370 feet ($112^{m}8$) high, about 5 miles northward of the southern extreme of the island.

Ilha Santa Carolina.—Light.—Beacon.—Ilha Santa Carolina is situated about 10 miles south-westward of Cabo Bazaruto; it is low but is readily identified, being well wooded and with a sandhill on its north-eastern side. It is the principal Portuguese establishment between Inhambane and Sofala and has a small garrison; on the approach of a vessel the Portuguese flag is displayed near the centre of the island.

A light is exhibited, at an elevation of 66 feet ($20^{m}1$), from an iron structure on a masonry column, 16 feet ($4^{m}9$) in height, situated near the northern extreme of the island.

A black, pyramidal, surveying beacon, 19 feet ($5^{m}8$) in height, stands on the highest part of the island.

Baía de Bazaruto.—Pilots.—Baía de Bazaruto is entered between Ponta de Carlos and Ponta Inhassoro on the mainland, about 12 miles west-south-westward. A considerable portion of the bay is encumbered with numerous drying banks which nearly surround Ilha Santa

Charts 648, 596, 597, 748a, 2483.

Chart 685, plan of Bazaruto bay.

Carolina; Baixo de Minhacanha lying southward, Baixo de J'anjani eastward, Baixo dos Phantasmas northward and Baixo do Xara north-westward, of that island.

A pilot may be obtained to take a vessel to the anchorage off Ilha Santa Carolina, and, as the channel is not buoyed, vessels without local knowledge should not attempt to proceed to this anchorage without one.

Anchorages.—Caution.—The approach to the anchorages is between the western edge of the bank which extends south-westward of Ponta de Carlos and a drying bank about 2 miles westward, the depths in the entrance being from 10 to 12 fathoms ($18^{m}3$ to $21^{m}9$), decreasing to 7 or 8 fathoms ($12^{m}8$ or $14^{m}6$) at the anchorage about 3½ miles south-westward of Ponta de Carlos, and to between 3 and 5 fathoms ($5^{m}5$ and $9^{m}1$) at the anchorage situated about a quarter of a mile north-eastward of Ilha Santa Carolina.

Anchorage, sheltered from southerly winds, was obtained by H.M.S. *Sylvia* northward of the spit between Cabo Bazaruto and Ponta de Carlos.

In 1937, shoal depths were reported in the approach to the anchorages, about 3 miles westward of Ponta de Carlos.

Chart 648.

Coast.—Off-lying dangers.—Little information is available about the low-lying coast between Ponta Inhassoro, the north-western entrance point to Baía de Bazaruto, and Ponta Macovane, the southern entrance point to Porto Bartolomeu Dias, about 25 miles northward.

A rock, over which there is a depth of 1½ fathoms ($2^{m}7$), is situated about 13½ miles north-westward of Cabo Bazaruto lighthouse.

Depths of 6 fathoms ($11^{m}0$) exist about 8 miles north-north-eastward of Cabo Bazaruto lighthouse. A shoal, with a depth of 4¼ fathoms ($7^{m}8$), lies about 10 miles north-north-eastward of the same lighthouse.

A shoal with a depth of 10 fathoms ($18^{m}3$) exists about 20½ miles northward of Cabo Bazaruto.

A shoal, over which the depths are less than 6 feet ($1^{m}8$), lies about 1½ miles offshore nearly 4 miles south-south-eastward of Ponta Macovane (*Lat. 21° 10′ S., Long. 35° 08′ E.*). A shoal, with a depth of 4¼ fathoms ($7^{m}8$) exists about 13½ miles east-south-eastward of Ponta Macovane.

Chart 648, plan of Port Bartolomeu Dias.

Porto Bartolomeu Dias.—Entrance.—Porto Bartolomeu Dias is a small harbour formed by a tongue of land which projects northward for about 3 miles on the eastern side of the mouth of Rio Govura, and terminates at Ponta Macovane. Ponta da Pedra, the western entrance point of Rio Govura, lies about 3 miles south-south-westward of Ponta Macovane, whence the western side of the harbour trends north-westward for about 4½ miles to Ilha de Maconde (Movinges), but the harbour is mostly encumbered with banks, which dry and leave only narrow channels. The Residency is situated about three-quarters of a mile southward of Ponta Macovane. Coasting vessels occasionally call at Porto Bartolomeu Dias.

The harbour is entered between Ponta Macovane and the southern extreme of Ponta Mafomene, about 5 miles northward, but both entrance points are fringed with drying banks which contract the entrance channel to a width of less than 5 cables. In 1951, a spit, *Chart 648, plan of Port Bartolomeu Dias.*

with less than 3 fathoms (5^{m}5) extended nearly 4½ miles north-north-eastward of Ponta Macovane and a bank with less than 3 fathoms (5^{m}5) extended about 2 miles east-south-eastward of Ponta Mafomene. Between the spit and the bank, depths varied from 15 to 41 feet (4^{m}6 to 12^{m}5) in the navigable channel. There was a bar with a least depth of 9 feet (2^{m}7) about 2½ miles eastward of Ponta Mafomene.

Anchorage.—At the anchorage close westward of Ponta Macovane, there were, in 1951, depths of 32 feet (9^{m}8).

Pilots.—Buoyage.—Pilots for Porto Bartolomeu Dias may be obtained at Beira, and, on account of the changing nature of the bar, no vessel should attempt to enter the port without a pilot.

The channel, which is subject to frequent change, is buoyed, the buoys being moved as necessary.

Chart 648.

Coast.—Off-lying dangers.—Old lighthouse.—Between 5 and 12 miles northward of Ponta Mafomene (*Lat. 21° 06′ S., Long. 35° 05′ E.*) is the delta of Rio Save (Sabi), which enters the sea through several shallow mouths, flowing between numerous islands. The outermost of these islands is Inhandunje, with Ponta Machanga at its northern extremity. Ilha de Macau, close westward of Inhandunje, is the largest island in the delta and has some sandhills on its northern part. Although Rio Save is not navigable, it was reported that, in 1892, it was ascended by boat for 30 miles, at which point it ceased to be tidal; on this occasion, it was entered by its northern mouth, which passes westward of Ilha de Macau, and the entrance then had a depth of 5 feet (1^{m}5) over the bar, and was half a mile in width.

A shoal, with a depth of 8 fathoms (14^{m}6) over it, lies about 20 miles north-eastward of Ponta Mafomene.

Chart 921.

Between Ponta Machanga and Ponta Ingomaimo, about 16 miles north-north-westward, the coast is fronted by shoal ridges on which the depths are from 2 to 5 fathoms (3^{m}7 to 9^{m}1), which extend as much as 10 miles from the coast, and, as the latter is barely visible from the outer shoals, constant sounding is necessary in this vicinity. Ponta Ingomaimo is low and sandy, and, having no mangroves on it, differs from other points in this locality.

Baixo Misadjuana lies about 15 miles northward of Ponta Machanga and has a least depth of 5 feet (1^{m}5). The shoal is steep-to on its north-eastern and south-western sides with depths of 9 and 10 fathoms (16^{m}5 and 18^{m}3) within 3 cables, but depths of less than 4 fathoms (7^{m}3) extend 15 cables north-westward and south-eastward of the shoalest patches. The position of the shoal is usually marked by heavy breakers, and, except for the old lighthouse on Punta Ingomaimo, no landmarks can be seen from it.

Chart 648.

Numerous shoals with depths varying from 3¾ fathoms (6^{m}9) to 6¼ fathoms (11^{m}4) lie within 22 miles east-north-eastward and east-south-eastward of Ponta Ingomaimo; the positions of these shoals can best be seen on the chart.

Chart 921.

An old lighthouse, which, in 1946, consisted of a white, hexagonal, concrete tower, 131 feet (39^{m}9) in height, is situated on Ponta Ingomaimo (*Lat. 20° 43′ S., Long. 35° 00′ E.*).

Charts 596, 597, 748a, 2483.

Chart 921.

Ilha Chiloane.—Light.—Buoys.—Ilha Chiloane lies partly within the mouth of Rio Ingomaimo, dividing it into North and South channels; North channel is that which is generally used but its banks are liable to change.

The island is of some little importance as a trading settlement, and exports rubber, ground nuts and gum; there is a small fort and a flagstaff near the residence of the Commandant on the southern side of the island, and there is also a flagstaff on Ponta Chinguno (Chingune), the north-western extreme of the island. Small quantities of fresh provisions are obtainable, but no vegetables.

As the island is low and in many places is only a mangrove swamp intersected by creeks, it cannot be seen from the vicinity of Baixo Misadjuana; it has no features which can be identified from south-eastward, but from northward, a few coconut palms near the northern coast, with a large clump of trees eastward of them, may be seen, but only from a distance of about 5 miles, and the south-eastern extreme of the island, which forms the northern entrance point to South channel, appears as a low bluff when seen from north-eastward.

A light is exhibited, at an elevation of 29 feet ($8^{m}8$), from an iron column on a white, masonry base, situated on Ponta Chinguno (*Lat. 20° 37′ S., Long. 34° 54′ E.*).

A conical buoy is moored about 4 miles east-north-eastward of Ponta Chinguno lighthouse and a spherical buoy is moored about 2 miles westward of the conical buoy.

South channel.—Dangers.—Anchorage.—South Breakwater, a shoal with depths of from 2½ to 3 fathoms ($4^{m}6$ to $5^{m}5$), lies about 4 miles eastward of Ponta Ingomaimo; near its northern extreme is Richardson knoll, with a least depth of a quarter of a fathom ($0^{m}5$) over it. A bar, on which the depths are one fathom ($1^{m}8$), is situated about two miles eastward of Richardson knoll; within the bar the depths increase, and anchorage in depths of 5 fathoms ($9^{m}1$), may be obtained near the flagstaff on the southern side of the island.

North channel.—Dangers.—Anchorage.—North Breakwater, a sandbank with a least depth of a quarter of a fathom ($0^{m}5$), lying about 4½ miles north-eastward of Ponta Chinguno, is a continuation of the extensive bank which fringes the coast northward of Ilha Chiloane, and which has not been examined; North channel lies between this bank and the shore bank which extends from the northern coast of Ilha Chiloane, and has depths of 2¼ fathoms ($4^{m}1$) on its bar. There is a channel between North Breakwater and the main coastal bank which is used by pilots, but the marks used by them cannot be identified by strangers. There are depths of from 4½ to 5 fathoms ($8^{m}2$ to $9^{m}1$), at an anchorage off Ponta Chinguno.

Channel connecting North and South channels.—The channel connecting North and South channels has a least depth of about one foot ($0^{m}3$) at the mouth of Rio Ingomaimo, but, by arranging to pass this part of the channel about the time of high water, vessels of a draught of 14 feet ($4^{m}3$), can be taken through it by a pilot.

Tidal streams.—The tidal streams attain a velocity at times of from 3 to 4 knots; they set strongly across North Breakwater and North channel.

Pilots.—It is advisable to obtain the services of a pilot to enter either North or South channel, and vessels usually embark one at Inhambane.

Charts 648, 596, 597, 748a, 2483.

Charts 648 and 921.

Directions.—Vessels from southward, after making the land about Ponta Machanga should not approach the land in that locality within 4 miles, but should steer northward and sound continuously. Except in the calmest weather, the breakers on Baixo Misadjuana should be seen.

Having sighted Baixo Misadjuana, and being within 3 miles of it, vessels bound for South channel may alter course towards the land, but local knowledge is necessary for this channel. If bound for North channel, course may be altered north-westward, and the vessel kept outside the banks which extend north-eastward of Ilha Chiloane. When Ponta Ingomaimo old lighthouse bears 230° or the south-eastern extreme of Ilha Chiloane, 261°, Richardson knoll will have been passed, and the coast may be approached to 2 miles, after which, course may be shaped 318° along the coast until Ponta Chinguno lighthouse bears 239°, when course should be altered to 264° until the lighthouse bears 205°, on which, the lighthouse should be brought to bear about a point on the port bow, which course will lead to the anchorage. Anchorage may be taken up with the lighthouse bearing about 122°, distant about 2½ cables, in depths of from 4½ to 5 fathoms (8^{m}2 to 9^{m}1).

The tangent of the land forming the south-eastern extreme of Ilha Chiloane, is a useful mark when about to cross the bar of North channel, and it should not be brought to bear less than 160° until Ponta Chinguno lighthouse bears 239°.

Vessels from northward should approach with Ponta Ingomaimo old lighthouse bearing about 180°, allowance being made if necessary for the tidal stream, until Ponta Chinguno lighthouse (*Lat. 20° 37′ S., Long. 34° 54′ E.*) bears 250°, when the latter lighthouse should be steered for on that bearing. When the tangent of the land forming the south-eastern extreme of Ilha Chiloane bears about 163°, course should be altered to 318° until Ponta Chinguno lighthouse bears 239°, when the directions given above should be followed.

Chart 648.

Coast.—Bank.—Shoals.—No examination has been made of the shore bank, which fronts the coast and extends over 6 miles in places between Ilha Chiloane and Ilha Cômo, an island which forms the southern entrance point to Baía de Sofala, about 26 miles north-north-westward of Ilha Chiloane. Small craft may obtain shelter in depths of from 2¾ to 4¾ fathoms (5^{m}0 to 8^{m}7), at Porto Boéne, a wide anchorage within Ilha Boéne, an island, covered with mangroves and palms, lying close to the coast about 13 miles north-westward of Ponta Chinguno.

Banco de Sofala, an extensive bank on which the depths are less than 40 fathoms (73^{m}2), extends about 70 miles eastward of Baía de Sofala; its eastern edge has not been completely examined. The depths on this bank increase very gradually eastward until near the edge of the bank, when they increase very rapidly. The nature of the bottom changes as the distance from the coast increases; near the coast the bottom is mud, changing to fine sand farther out, which gradually becomes coarser and is very coarse near the eastern edge.

Several shoals, with depths of from 7½ to 8 fathoms (13^{m}7 to 14^{m}6), lie on Banco de Sofala from 18 to 22 miles offshore and in the track of shipping approaching Beira from the southward; the positions of these shoals can best be seen on the chart.

Charts 596, 597, 748a, 2483.

Chart 648, plan of Baia de Sofala.

Baía de Sofala.—Light.—Buoy.—Shoal.—Baía de Sofala is entered between Ilha de Cômo and a low point about 2 miles northward. The town of Sofala is in the vicinity of this point. The land near the town is low with scarcely any trees, except some coconut palms, northward of the ruins of a fort, which stand close southward of the low point mentioned above. Near the head of the bay the land rises and is irregular and has tall and scattered trees on it. The town is the residence of a Portuguese Governor, but the population is decreasing and trade is insignificant.

A light is exhibited, at an elevation of 41 feet ($12^{m}5$) from a white, truncated, conical tower, situated at the north-eastern extreme of Ilha de Cômo (*Lat. 20° 13′ S., Long. 34° 44′ E.*).

Porto de Sofala stands at the entrance to Rio Dondo and the approach is much obstructed by banks. In 1951, there was a depth of 7 feet ($2^{m}1$) on the bar, which then lay about 3¼ miles south-westward of the above light-structure. Within the bar the depths gradually increase to 41 feet ($12^{m}5$) abreast the light-structure. Above this point, the channel narrows and the depths decrease to 3 feet ($0^{m}9$) at the entrance to Rio Dondo, about 3½ miles north-westward of the light-structure. Anchorage may be obtained in a depth of 26 feet ($7^{m}9$) about 6 miles east-south-eastward of the light-structure.

A small black conical buoy is moored about 7½ miles east-south-eastward of the ruins of the fort.

A shoal with a least depth of 4 fathoms ($7^{m}3$), lies about 14 miles east-south-eastward of Ilha de Cômo light-structure.

Charts 1003, 648.

Coast. — Beacon. — Shoals. — Light-buoys. — Between Ilha Cômo and Ponta Macique, the western entrance point to Rio Pungue about 20 miles northward, the coast is low and there are no landmarks. Bush and grass fires frequently occur during July, August and September, and the coastline is often obscured by smoke. Ponta Macique is also the northern entrance point to Rio Búzi, a river which, in 1895, was navigable for 25 miles within its mouth by vessels of a draught of 9 feet ($2^{m}7$). In 1949, there was a least depth of one fathom ($1^{m}8$) on the bar about three-quarters of a mile southward of Ponta Macique.

A beacon, painted in black and white horizontal bands, stands on Ponta Macique (*Lat. 19° 52′ S., Long. 34° 47′ E.*).

The approach to Rio Búzi and Rio Pungue is much obstructed by shoals, and depths of less than 18 feet ($5^{m}5$) are found up to 10 miles eastward, 13 miles east-south-eastward and south-eastward of the southern extremity of Ponta Macique.

Shoals with a least depth of 16 feet ($4^{m}9$), 19 feet ($5^{m}8$) and 27 feet ($8^{m}2$) exist about 14, 24 and 26 miles east-south-eastward, respectively, of the southern extremity of Ponta Macique.

A shoal with a depth of 7 fathoms ($12^{m}8$) over it exists about 31 miles eastward of the southern extremity of Ponta Macique.

The entrance to Rio Búzi is marked by two light-buoys; Fairway conical light-buoy painted in black and white vertical stripes and exhibiting a *white flashing* light *every five seconds*, is moored about one mile south-south-eastward of Ponta Macique; a red can light-buoy, exhibiting a *white group flashing* light, showing *two* flashes *every ten seconds*, is moored about 5 cables southward of Ponta Macique.

Charts 596, 597, 748a, 2483.

Chart 1003.

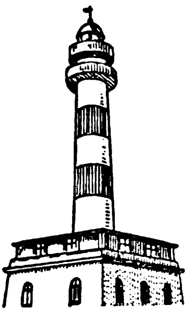
RIO PUNGUE AND PORTO DA BEIRA.—Depths.—Rio Pungue is entered between Ponta Macique (*Lat. 19° 52′ S., Long. 34° 47′ E.*) and Ponta Géa about 3 miles north-eastward, and as the land about the entrance is very low, it is not visible to vessels approaching from southward until about 12 miles south-eastward of the entrance, when a series of low sandhills, covered with scrub, may be seen northward of the river mouth. The beacon on Ponta Macique is prominent and the mangroves on that point, which are 40 feet ($12^{m}2$) in height, give it the appearance of a dark bluff. The pilot vessel, which is stationed about 10 miles south-south-eastward of Macuti lighthouse, may be of assistance in making the entrance to the approach channel. Ponta Macuti lighthouse and two radio masts about one mile eastward of Ponta Géa are noticeable, while on a closer approach, the spire of the cathedral, about 150 feet ($45^{m}7$) in height and situated about three-quarters of a mile eastward of Ponta Géa, is most prominent.

Two metal towers, 138 feet ($42^{m}0$) in height, stand nearly 1¾ miles east-north-eastward of Ponta Géa and about half a mile north-eastward of the airfield.

Porto da Beira, the second principal port of Moçambique, is situated on the eastern bank of the river close within the entrance. Vessels that can cross the bar can obtain anchorage or secure to moorings in the river abreast the port in depths of from 18 to 40 feet ($5^{m}5$ to $12^{m}2$), or may berth alongside a wharf in depths, in 1949, of 30 feet ($9^{m}1$). In 1949, there was a least depth of 13 feet ($4^{m}0$) in the entrance channel.

No vessel of greater draught than 25 or 26 feet ($7^{m}6$ or $7^{m}9$) should attempt to enter the harbour at neap tides. The harbour should not be entered after high water at the bar, and vessels should not leave the harbour during the period of the out-going tidal stream.

The depths on the bar are considerably affected by wind; it is stated by pilots that a good guide to the depths on the bar is given by the depths at " P " light-buoy, close to which the pilot vessel is stationed, there being 26 feet ($7^{m}9$) greater depth at the buoy than on the bar.



Ponta Macuti lighthouse from southward.
(*Original dated* 1949.)

Light.—Signal station.—Light-buoys.—A light is exhibited, at an elevation of 87 feet ($26^{m}5$), from a circular tower, painted in black and white bands, 92 feet ($28^{m}0$) in height, situated on the coast about 4 miles eastward of Ponta Géa and nearly a mile eastward of Ponta Macuti.

A signal station, with which vessels can communicate by the International Code of Signals, and which is in telegraphic communication with the Port Office, is situated near Ponta Macuti lighthouse.

A conical light-buoy, painted in black and white vertical stripes and exhibiting a *white group flashing* light, showing *two* flashes *every seven seconds*, is moored about 19 miles south-eastward of Ponta Macuti lighthouse.

A conical light-buoy, painted in black and white horizontal bands and exhibiting a *white flashing* light *every three seconds*, is moored about 11 miles south-eastward of Ponta Macuti lighthouse.

" P " black conical light-buoy, exhibiting a *green flashing* light,

Chart 1003.

showing a *short* flash *every four seconds*, is moored about 10½ miles south-south-eastward of Ponta Macuti lighthouse.

Pilotage.—Pilotage is compulsory for merchant vessels. The pilot vessel, is stationed about 10 miles south-south-eastward of Ponta Macuti lighthouse and close westward of " P " light-buoy (*Lat. 20° 00′ S., Long. 34° 59′ E.*). In rough weather, the pilot vessel will, whenever possible, sound the bar ahead of the vessel entering and will signal the depths ascertained.

A tug is always available, but if required at the bar, some hours' notice is required.

Entrance channels.—The approach to Rio Pungue is obstructed by numerous banks and shoals, which partly dry and which are constantly changing. A buoyed channel, the outer portion of which is called Canal Portela and the inner portion Canal Rambler, leads through the banks to Porto da Beira. In 1949, there was a least depth of 14 feet ($4^{m}3$) on the bar across Canal Portela, and of 13 feet ($4^{m}0$) in Canal Rambler. Canal Portela and Canal Rambler are the only channels available to vessels of deep draught. The other channels closer to Ponta Macuti (*Lat. 19° 51′ S., Long. 34° 53′ E.*) have silted up and are no longer used.

Light-buoys.—Light.—Canal Portela and Canal Rambler are marked by light-buoys ; the positions of the light-buoys, as indicated on chart 1003, are approximate, as the entrance channel is subject to constant change, and the buoys are moved accordingly.

No. 2 red can light-buoy, exhibiting a *red flashing* light *every four seconds*, is moored on the southern side of Canal Portela.

No. 1 black conical light-buoy, exhibiting a *green group flashing* light, showing *two* flashes *every five seconds*, is moored at the eastern end of Canal Portela.

No. 4 red can light-buoy, exhibiting a *red group flashing* light, showing *two* flashes *every five seconds*, is moored on the southern side of the channel nearly 7 miles south-south-eastward of Ponta Géa.

No. 3 black conical light-buoy, exhibiting a *green flashing* light *every three seconds*, is moored on the northern side of Canal Portela about 3 cables northward of No. 4 light-buoy.

No. 5 black conical light-buoy, exhibiting a *green group flashing* light, showing *two* flashes *every five seconds*, is moored about 5½ miles south-south-eastward of Ponta Géa.

No. 7 black conical light-buoy, exhibiting a *green flashing* light *every four seconds*, is moored on the eastern side of the channel about 4¾ miles south-south-eastward of Ponta Géa.

No. 6 red can light-buoy, exhibiting a *red group flashing* light, showing *three* flashes *every seven seconds*, is moored on the western side of the channel about 4 miles south-south-eastward of Ponta Géa.

No. 9 black conical light-buoy, exhibiting a *green flashing* light *every four seconds*, is moored on the eastern side of Canal Rambler about 3 miles southward of Ponta Géa.

No. 11 black conical light-buoy, exhibiting a *green group flashing* light, showing *two* flashes *every five seconds*, is moored at the northern end of Canal Rambler about 1½ miles south-south-westward of Ponta Géa.

No. 13 black conical light-buoy, exhibiting a *green flashing* light *every five seconds*, is moored close westward of Ponta Géa.

Charts 648, 596, 597, 748a, 2483.

Chart 1003.

No. 8 light-beacon (*Lat. 19° 50′ S., Long. 34° 49′ E.*), a red, triangular, iron framework structure, 28 feet ($8^{m}5$) high, exhibiting a light at an elevation of 32 feet ($9^{m}8$), stands about 4 cables west-north-westward of Ponta Géa.

A black can buoy marked " Shell " is moored on the edge of the shoal water on the eastern side of the channel about midway between Ponta Géa and Ponta Chiveve, about 8 cables northward.

Porto da Beira. — Wharfage. — Mooring buoys. — Lights. — Porto de Beira stands on either side of the mouth of Rio Chiveve which is situated nearly three-quarters of a mile northward of Ponta Géa. Ponta Chiveve, its southern entrance, point is protected by a sea-wall which surrounds it and extends about half a mile southward; an embarkation pier projects northward from the extreme of Ponta Chiveve.

The Customs lighter wharf extends for about 600 feet ($182^{m}9$) eastward of the root of the embarkation pier; lighters are, however, unable to go alongside in bad weather or at low water.

The Railway lighter wharf is situated on the northern bank of Chiveve creek, and is connected at its western end to Chiveve wharf; the total wharfage is 1,476 feet ($449^{m}9$). Lighters can load and unload at Chiveve wharf at any state of the tide, but it dries alongside at low water.

The Pungue wharf extends northward for about 2,700 feet ($823^{m}0$) from the north-western end of Chiveve wharf; in 1949, it had a least depth alongside of 30 feet ($9^{m}1$). Pungue wharf can accommodate five large ocean-going vessels; No. 5 berth, at the northern end of the wharf, is equipped for the discharge of tankers. The approach to the graving dock (page 231) lies between the northern end of this wharf and the adjacent shore.

Close northward of Pungue wharf, an **L**-shaped pier projects from the shore. The pier is 800 feet ($243^{m}8$) in length and has a depth alongside of 22 feet ($6^{m}7$).

A line of mooring buoys, numbered one to six from seaward, is situated in the centre of the navigable channel abreast the port.

A light is exhibited from the outer end of the embarkation pier at Ponta Chiveve, and another light at an elevation of 73 feet ($22^{m}3$) from a mast on the Harbour Master's office about one cable southward.

Anchorages.—Vessels of war and merchant ships which cannot be accommodated alongside Pungue and Railway wharves, secure to one of the mooring buoys. If obliged to anchor, it is nearly always necessary to moor, owing to the large number of vessels using the port.

The anchorage for vessels of war is between two imaginary lines drawn 270° from the highest part of the hospital, a red-roofed building on the sea-wall, and from the Intendencia flagstaff, which is the highest flagstaff in the town.

The anchorage for merchant vessels is northward of an imaginary line drawn 270° from the light-structure on the embarkation pier on Ponta Chiveve (*Lat. 19° 49′ S., Long. 34° 50′ E.*); above this, and close inshore, is the anchorage for hulks.

The anchorage for vessels carrying explosives, is southward of an imaginary line drawn 228° from the hospital, and eastward of an imaginary line drawn 166° from the south-eastern extreme of Ilha Utanha (Utanhe).

Charts 648, 596, 597, 748a, 2483.

Chart 1003.

Tidal streams.—The tidal streams are very strong, especially in the wet season with a high river, when the out-going tidal stream attains a velocity of 5 knots at springs and from 2 to 3 knots at neaps; in the dry season when the river is low, the velocity of the out-going tidal stream at springs is 4 knots, and at neaps is from 1½ to 2 knots. The in-going tidal stream has a velocity of from one to 3 knots.

During springs, the out-going tidal stream runs from 7 to 8 hours, and the in-going tidal stream from 5 to 4 hours, with hardly any period of slack water.

Allowance should be made for the effect of the tidal streams when entering or leaving, as they set obliquely across the channels in places; neglect of this precaution often leads to vessels grounding, but as the bottom is soft, they usually get off without damage.

Directions.—Vessels should make for a position about 19 miles east-south-eastward of Ponta Macuti lighthouse (*Lat. 19° 51′ S., Long. 34° 54′ E.*), and thence, having regard to the shoal water in the vicinity, steer for " P " light-buoy, close to which latter a pilot may be embarked. When proceeding through Canal Portela and Canal Rambler, guided by the buoys, vessels should guard against the effect of the tidal streams.

Port facilities.—Pungue and Chiveve wharves are connected to the general railway system. There are nine 6-ton and fifteen 3-ton cranes on Pungue wharf; there is a 20-ton crane on Chiveve wharf, also one of 5 tons and eight 3-ton cranes.

There are five sea-going tugs and four harbour tugs and there are three sea-going salvage vessels.

There are also 77 lighters and barges.

Supplies.—No coal is available for shipping.

A moderate quantity of diesel oil is stocked and can be taken in alongside Pungue wharf (*Lat. 19° 49′ S., Long. 34° 50′ E.*) at the rate of 50 tons per hour.

Fresh provisions are obtainable; ample notice is necessary for a large quantity.

Water is supplied by 7 water-boats at the rate of 50 tons per hour per boat. No drinking water is available.

Repairs.—Small repairs and castings up to one ton can be executed. There is a small privately maintained graving dock. For details, *see* Appendix II.

The services of a port diver are available if required.

Town.—Beira is the principal port of Moçambique and capital of the district of Manica and Sofala, and, being the terminus of the railway to Salisbury, it is of growing importance. A British Consular officer is resident.

In 1945, the population of Beira was 13,970, of whom about 4,000 were Europeans.

During the year 1949, a total of 457 ocean-going merchant vessels, with an aggregate tonnage of 3,541,212 tons, entered the port; of these, 252 were British.

There is a hospital at Beira.

Health.—The most unhealthy season is probably the month of May, when the country dries up, but for four months after that, the weather becomes almost pleasant, and health improves.

The prevalence of mosquitos has been greatly reduced by filling in

Charts 648, 596, 597, 748a, 2483.

Chart 1003.

part of Rio Chiveve, the reclamation of land, and the clearing of bush for the extension of the town.

Communications.—There is regular communication by sea with other East African ports and with Europe.

There is railway communication with the general Rhodesian and South African system; there is also railway communication with British Nyasaland via the Trans-Zambesia and Central African railways.

Beira is connected to the general telegraphic system.

There is regular air service with Europe and South Africa and there is a regular coastal air service between Quelimane, Beira, Inhambane and Lourenço Marques.

There is a radio station at Beira, *see* page 35.

Climatic table.—*See* page 72.

Rio Pungue above Beira.—Vessels of a draught of about 9 feet (2^{m}7) can ascend the river for 12 miles above Beira (*Lat. 19° 50′ S., Long. 34° 50′ E.*); beyond this point the navigable channel is winding and the banks and crossings are continually changing, and it is not advisable to ascend further without local knowledge or the assistance of a pilot, although it is navigable for small vessels of a draught of 4 feet (1^{m}2) for about 100 miles during the season of high river, and for about 50 miles during ordinary low river.

At times, with a very low river, and at neap tides, it is only navigable for canoes as far as Ponta Nhamacade, a few miles above the railway bridge which spans the river at Fontesvilla, about 35 miles above Beira. In the height of the dry season, about mid-July, the in-going tidal stream at Mapanda, 43 miles above Beira, only flows for about one hour each tide, the rise being 18 inches (0^{m}5) at springs and 9 inches (0^{m}2) at neaps; no records are available for the rise during the rainy season.

The seasonal rise of the river closely resembles that of Rio Zambeze, *see* page 239, and begins in December or January and attains its maximum height about March, after which it falls, reaches its minimum about the end of August, and remains low until October or November.

Chart 648.

PONTA GÉA TO PONTA INHAMIARA.—Coast.—Beacon.—Between Ponta Géa (*Lat. 19° 50′ S., Long. 34° 50′ E.*) and the mouth of Rio Mavendeni, about 40 miles north-eastward, the coast rises slightly and is backed by a line of low sandhills; about 20 miles north-eastward of Ponta Géa, these sandhills are bare, about 200 feet (61^{m}0) high, and shaped like pyramids, and they stand out conspicuously against the surrounding country, which is densely wooded. North-eastward of the mouth of Rio Mavendeni the coast is lower and numerous small rivers enter the sea along the 50 miles stretch of coast between the mouths of Rio Mavendeni and Rio Luaua, also known as Rio Luabo de Oeste.

A beacon, consisting of a wooden truncated pyramid, surmounted by a staff and double cone, 72 feet (21^{m}9) in height, is situated near the mouth of Rio Macuti, about 4½ miles north-eastward of Ponta Macuti lighthouse.

Charts 648, 1810.

Rio Luaua is entered between Kirk point and Ord point; the latter point is thickly wooded and there is a range of hummocks

Charts 596, 597, 748a, 2483.

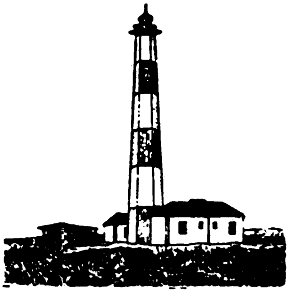
Charts 648, 1810.

near its eastern bank which may assist in identification, as the land south-westward of Kirk point is low. Although the entrance is only about 3 miles westward of the commencement of the delta of Rio Zambeze (Zambezi), Rio Luaua has no connection with the latter river. Its bar is subject to considerable changes; in 1861, there were depths of from 3 to 6 feet ($0^{m}9$ to $1^{m}8$) on the bar, which then extended over 2 miles seaward of the entrance. Within the entrance, there were depths of 2 fathoms ($3^{m}7$) for about 20 miles, near which point it is joined by the Thornton river from westward and above which no examination has been made. Both in-going and out-going tidal streams run regularly in the river at rates of from 1½ to 2 knots.

Delta of Rio Zambeze.—Light.—The several mouths of Rio Zambeze, which, with the islands separating them, form its delta, extend from the mouth of Rio Melambe, which lies about 4 miles eastward of Ord point, to Ponta Inhamiara (Nhamiara), the northern entrance point of Rio Chinde, about 31 miles north-eastward. From westward, these mouths are known as Rio Melambe, Rio Inhamissengo, Rio Cuama, also known as Boca de Zambeze and Rio Luabo de Este, Rio Muselo and Rio Chinde with Rio Maria (Inhamacatiua) entered from it. All these entrances have bars on which the depths are constantly changing ; Rio Chinde, although one of the narrowest and most tortuous, is the deepest and is the entrance now used.

The islands separating the various mouths are low, the tops of their trees being 50 to 80 feet ($15^{m}2$ to $24^{m}4$) in height, and their similarity of appearance makes it difficult to identify any particular one ; the mouth of Rio Cuama is perhaps the most easily distinguished as it has the widest and straightest entrance, being 1½ miles wide between two comparatively high and densely wooded points.

A light, known as Bocas do Zambeze, is exhibited, at an elevation of 128 feet ($39^{m}0$), from a hexagonal, concrete tower, 131 feet ($39^{m}9$) in height, painted with red and white bands, situated near the eastern extreme of Ilha Timbué, an island which forms the eastern side of Rio Cuama and the southern side of Rio Muselo.



Bocas do Zambeze lighthouse from south-eastward.
(*Original dated* 1949.)

In 1894, there was a considerable population on Ilha Timbué and a few straggling villages on Ilha Inhangurue, an island separating Rio Cuama and Rio Inhamissengo. Supplies of fruit were obtainable at Conçeicao (*Lat. 18° 43′ S., Long. 36° 09′ E.*), on the western bank, about 10 miles within the entrance to Rio Inhamissengo, and big game abounded in the delta.

For description of Rio Zambeze above the delta, *see* page 238.

Offshore depths.—Off-lying dangers.—A line of soundings with depths of from 13 to 16 fathoms ($23^{m}8$ to $29^{m}3$), passes about 11 miles off the mouths of the delta as far eastward as the mouth of Rio Muselo, thence about 18 miles offshore until abreast of the mouth of Rio Chinde, whence the depths decrease gradually on approaching the coast to 5 fathoms ($9^{m}1$), at 5 miles off the entrance to Rio Chinde.

Charts 597, 748a, 2483.

Charts 648, 1810.

In 1925, a depth of 10 fathoms (18^m3), marked by discoloured water, was reported to lie about 13½ miles north-eastward of Bocas do Zambeze lighthouse ; this shoal has not been examined.

Entrances to delta.—Caution.—The large volume of water which flows out of the various mouths during the rainy season, combined with the continuous, heavy, ocean swell, so alters the position of the several bars, that the entrances are never alike for two seasons.

The bars probably have their maximum depth during the time that the river is in flood, from the end of February to the end of March, and their minimum depth from September to the beginning of November, especially the latter period, which is the end of the dry season. Attempts to cross the bars, details of which are given below, should never be made without the assistance of a pilot or previous examination.

During the rainy season, the level of the river rises in floods from 15 to 20 feet (4^m6 to 6^m1), and sweeps down to the sea with great velocity causing very considerable variation in depth within the entrances. After the month of March, the level of the river falls rapidly, and, at the middle of the dry season, the river is reduced to narrow channels winding between dry sandbanks, and is, in places, too shallow to permit the passage of a vessel of a draught of 18 inches (0^m5) ; there is, therefore, no permanence in either the direction or the depth of the navigable passages.

Rio Melambe.—This entrance, the westernmost mouth of Rio Zambeze, has not been examined.

Rio Inhamissengo.—This entrance was formerly the main entrance to Rio Zambeze and had the port of Conçeicao 10 miles within its bar, but it is now seldom used, having been abandoned in 1891 in favour of Rio Chinde. It is situated about 3 miles eastward of Rio Melambe and both its entrance points are fringed with sandbanks and breakers which extend about 1½ miles seaward where they are connected by a narrow sand bar on which the depths are from 2 to 5 feet (0^m6 to 1^m5) ; the greater depth is found in March during the height of the rainy season. The bar has been crossed by a steam vessel with a draught of 12 feet (3^m7), and in 1893, it was reported that there was then a depth of 19 feet (5^m8) on the bar at high water, springs.

Within the bar there are depths of from 2 to 5 fathoms (3^m7 to 9^m1) in the channel which extends northward on a moderately straight course for about 12 miles, when it forks. The north-western branch is shallow and is little used and joins the main channel of Rio Zambeze about 20 miles above the bar ; in October 1893, H.M.S. *Mosquito*, a stern-wheel vessel drawing 2 feet 10 inches (0^m9) with a length of 77 feet (23^m5) and beam 18 feet (5^m5), anchored in this branch about 5 miles above the fork, near Lago Sacasse. The eastern branch is reported to have a depth of 2 fathoms (3^m7) in it, but the channel is tortuous and difficult, and is only 30 feet (9^m1) wide in places. In 1893, H.M.S. *Mosquito* passed through this channel with some difficulty ; it was by this branch that Dr. Livingstone entered Rio Zembeze.

Close within the eastern entrance point of Rio Inhamissengo, there is a narrow channel named Inhangurue, which communicates with Rio Cuama passing northward of Ilha Inhangurue ; H.M.S. *Mosquito* passed through this channel during the period of low river in November 1894, in a least depth of 5 feet (1^m5).

Charts 596, 597, 748a, 2483.

Charts 648, 1810.

Rio Cuama.—This entrance, which is also known as Bôca do Zambeze or Rio Luabo de Este is separated from Rio Inhamissengo by Ilha Inhangurue, about 4 miles in length. It is entered between First Bluff point, the eastern extreme of Ilha Inhangurue, and Hyde Parker point (*Lat. 18° 52′ S., Long. 36° 19′ E.*), the south-western extreme of Ilha Timbué, about 1½ miles eastward. First Bluff point is so named on account of its high, straight trees standing close together, and both entrance points are sufficiently noticeable, when taken in conjunction with the wide entrance between them, to be readily identified. Shoal depths extend about 3½ miles seaward of the entrance, and, at low water, a large portion of the bar dries, and the sea breaks right across the entrance ; the bar is reported to be impracticable during the dry season. In the rainy season the river banks are frequently inundated at springs for three or four days at a time, and, during the period of the out-going tidal stream, the water is fresh as far as the bar.

Rio Muselo.—This mouth is entered between the eastern extreme of Ilha Timbué, on which stands the lighthouse, and some sandy cliffs which form the south-eastern extreme of Ilha Inhacombe (Inhacamba) ; within the entrance, the banks are thickly wooded. The bar extends about 4 miles seaward of the entrance, and, when examined in 1894, was reported to be impracticable even for boats in fine weather, there being a heavy surf in the only place where there appeared to be a channel. Within the bar, the channel was examined during the dry season in October, 1894, by H.M.S. *Mosquito*, and a depth of only 3 feet ($0^{m}9$) was found in one place.

Anchorage.—Directions.—Tidal streams.—Anchorage may be obtained in fine weather off the bar of Rio Inhamissengo in depths of 27 feet ($8^{m}2$), sand, but, except in fine weather, vessels should anchor farther out. The current generally sets westward causing vessels at anchor to lie broadside on to the prevailing south-easterly winds, and to roll considerably.

Unless certain of their position, vessels should make Bocas do Zambeze lighthouse, or the wide and well-defined entrance to Rio Cuama before proceeding to the anchorage off Rio Inhamissengo. Having ascertained the position, vessels should steer south-westward along the coast in depths of not less than 27 feet ($8^{m}2$), until the entrance to Rio Inhamissengo is identified, when anchorage may be taken up.

Before attempting to cross the bar, it should first be examined as, at low water the surf breaks right across it and the channel cannot be distinguished, but the depths increase within the bar.

The out-going tidal stream has a velocity at springs of from 4 to 5 knots in the entrance to Rio Inhamissengo. The tidal rise and fall is felt for about 25 miles within the mouths of the delta, and the effect of the in-going tidal stream in checking the current of the river, is felt for many miles farther up-river. Apart from tidal influence, the rate of flow of Rio Zambeze varies from 1½ to 3½ knots according to season.

Chart 1421, plan of Rio Chinde.

Rio Chinde.—Entrance.—Channel.—Lights.—For many years Rio Chinde has been the only entrance to Rio Zambeze in general use ; it is about 20 miles in length from its mouth to the junction with the main river, and is very tortuous.

Charts 597, 748a, 2483.

Charts 1810 and 1421, plan of Barra and Porto do Chinde.

Rio Chinde is entered between Ponta Liberal, about 16 miles north-north-eastward of Bocas do Zambeze lighthouse, and Ponta Inhamiara, about 3½ miles farther north-eastward. Close westward of Ponta Inhamiara lies the estuary of Rio Inhamiara, which, in 1951, had entirely dried up.

Ponta Liberal (*Lat. 18° 34′ S., Long. 36° 28′ E.*), on which stands the town of Chinde, is low, as is the adjacent land, which is similar to that of the other entrances to Rio Zambeze. The entrance may be identified at a short distance by the somewhat conspicuous sandhills, 57 feet ($17^{m}4$) in height, situated about one mile northward of Ponta Inhamiara.

The entrance is fronted by numerous sandbanks which extend seaward about 2½ miles, and the inner parts of which dry from 8 to 10 feet ($2^{m}4$ to $3^{m}0$) ; the sea breaks heavily on these banks. There is a bar across the entrance, situated near the outer edge of the drying banks, and, as changes in the position of, and depths in the channel across the bar, are frequent, vessels should not attempt to enter without a pilot or previous examination. In 1951, there was a least depth of 6 feet ($1^{m}8$) on the bar, and of 4 feet ($1^{m}2$) in the approach channel in the harbour.

Chinde light is exhibited, at an elevation of 35 feet ($10^{m}7$), from a white, wooden truncated conical tower, situated on the beach just over a mile south-south-westward of Ponta Liberal.

A light is exhibited at an elevation of 43 feet ($13^{m}1$) from a white, quadrangular concrete framework tower, 33 feet ($10^{m}1$) in height, situated on Ponta Inhamiara.

Beacons.—Buoys.—Caution.—In 1951, a pair of leading beacons, with triangular topmarks, the front one point down and the rear one point up, were situated on the northern bank of Rio Chinde about 2 miles north-eastward of Ponta Liberal. These beacons, in line astern bearing 055°, led through the approach channel mentioned above.

A fairway spar buoy, painted in black and white stripes and surmounted by a cylindrical topmark, is situated outside the bar in the approach to the entrance channel about 4¼ miles southward of Ponta Inhamiara light-structure. The channel between the bar and the anchorage is marked by numbered spar buoys painted in accordance with the uniform lateral system, *see* page 32.

The red buoys are even-numbered and the black buoys, which have a white stripe on the upper part of the spar, are odd-numbered.

In 1950, vessels entering were advised to await favourable tidal conditions off the fairway buoy and thence navigate from buoy to buoy, leaving the red buoys to port and the black buoys to starboard as far as No. 6 buoy, whence a leading line can be followed to No. 8 buoy and the port.

A mooring buoy, allocated to the Captain of the Port, is situated in the inner part of the port on the northern side of the harbour ; anchorage is prohibited in the vicinity of this buoy.

Owing to the frequent changes in the channel, the leading beacons and buoys are moved as necessary, and no great reliance can therefore be placed on their positions.

Tidal streams.—Rio Chinde is tidal throughout, the in-going and out-going tidal streams turning about one hour after high and low water, respectively, at the bar. At springs, the out-going tidal

Charts 1810, 597, 748a, 2483.

Charts 1810 and 1421, plan of Barra and Porto do Chinde.

stream attains a velocity of 3½ knots, and the in-going tidal stream of 2½ knots; during neaps, there is occasionally no perceptible in-going tidal stream and the out-going tidal stream is only one to 2 knots.

Pilotage.—Tugs.—Pilotage is necessary for vessels entering the port for the first time; pilots must be obtained from Porto da Beira or Quelimane. Native pilots for the river are both numerous and skilful.

Two tugs are available if required.

Anchorages.—Vessels may anchor outside the fairway buoy in depths of 4 to 5 fathoms (7^m3 to 9^m1) about 4 miles east-south-eastward of Ponta Liberal (*Lat. 18° 34′ S., Long. 36° 28′ E.*), but, the anchorage is not recommended on account of its being open to the prevailing southerly winds. Good anchorage may be obtained in the river between Ponta Liberal and Ponta Luabo about 2½ miles westward in depths of from 15 to 24 feet (4^m6 to 7^m3), good holding ground; vessels should moor. Strong easterly winds render anchorage close within Ponta Liberal untenable for small craft, but at such times, they can obtain anchorage further westward. In 1922, many wrecks were reported to lie in the roadstead. Vessels are allotted anchorage berths by the Captain of the Port.

Supplies.—Fresh provisions are fairly plentiful.

Water taken from Rio Zambeze when the river is in flood, is turbid, and leaves a certain amount of deposit if left to stand, but it is always good when filtered. Water from wells should be avoided, but if used, it should be boiled.

Town.—The settlement of Chinde became the port at the mouth of Rio Zambeze in 1891 when entrance by Rio Inhamissengo was abandoned. It is situated on Ponta Liberal and is administered by an Intendente; mainly owing to sea breezes, the settlement is comparatively healthy and a short stay frequently benefits those from the interior who are suffering from malarial fever. There is a hospital.

Although there is a considerable local trade in sugar and sisal, no regular river services have been run from Chinde since the completion of the Trans-Zambesian railway, which crosses the river near Murraça, *see* page 241, and continual erosion of the foreshore and occasional heavy floods, hinder the construction of any effective harbour works.

In 1946, the population of Chinde was 62,650, of whom 300 were Europeans.

Communications.—No ocean-going vessels now call at Chinde, but there is a regular small coasting vessel service between Chinde, Beira and Quelimane.

Chinde is connected to the general telegraphic system.

Chart 1421, plan of Rio Chinde.

Rio Chinde from Ponta Luabo to junction with Rio Zambeze.—Directions.—For most of its length, the banks of Rio Chinde are fringed with dense mangroves rising from black, viscous mud, but, when nearing the junction with Rio Zambeze, the mangroves cease and the banks become higher and sandy and are composed of clay in places.

From Ponta Luabo (*Lat. 18° 34′ S., Long. 36° 25′ E.*) for about 10 miles to one mile above the village of Sombo, the river is about one cable wide; thence, to the old village of Chinde, which is situated on the southern bank at the junction with Rio Zambeze, it is much

Chart 1421, plan of Rio Chinde.

narrower. In 1925, there was a least depth of 8 feet (2^m4), on the bar abreast the old village of Chinde.

Between the anchorage abreast Chinde and the point where the river narrows about one mile above Sombo, the depths in the river are sufficient at all states of the tide for vessels that can enter Porto do Chinde ; above this point, the river is so narrow that vessels of about 150 feet (45^m7) in length, cannot anchor, and must proceed into Rio Zambeze to turn, and the time of arrival at Sombo should therefore be timed for about one hour before high water. At the junction, a sharp turn round a spit fringing the northern entrance point, is necessary, and the channel here is very narrow, being only about 90 feet (27^m4) between the spit and a bank in mid-channel of Rio Zambeze. In 1890, H.M.S. *Redbreast*, a vessel 165 feet (50^m3) in length, anchored just above the junction in 4 fathoms (7^m3), but had to shorten in cable when swinging to the tidal stream.

Tributaries and adjoining rivers.—Rio Maria (Inhamacatiua) enters Rio Chinde on the northern bank between Ponta Sulimane (Fremantle) and Ponta Maria, about 3 cables north-westward and 6 cables north-eastward, respectively, of Ponta Luabo ; its entrance is over half a mile wide, but is encumbered with two islets and some drying banks. In 1893, H.M.S. *Mosquito* proceeded through Rio Maria during the season of low river, and without difficulty reached Rio Zambeze at a point about 6 miles above Rio Chinde junction. This route is reported to be about 1½ hours shorter than that by Rio Chinde, but the depths were as little as 3½ and 4 feet (1^m1 and 1^m2) in places. A telegraph wire, 14 feet (4^m3) above high water, springs, spans the river about 2 miles above the entrance.

Rio Inhaombe, a tributary of Rio Maria, was also ascended for about 10 miles, at which point it nearly dries, and H.M.S. *Mosquito* also reached Rio Maria by the branch, about 3½ miles in length, which is entered nearly one mile south-westward of Ponta Luabo.

Charts 748a and b.

RIO ZAMBEZE.—General remarks.—Rio Zambeze, known as the Zambezi river above its entry into Portuguese territory, rises near the north-eastern border of Angola, and after a course of more than 1,200 miles, enters the sea through an extensive delta between the mouths of Rio Melambe and Rio Chinde. From its source, the river flows southward and enters Northern Rhodesia where it receives the Luena river and the Luanginga river from westward and becomes known as the Upper Zambezi, whence it flows a little eastward of south for nearly 300 miles and then turns eastward and runs over the Victoria falls. Below the falls, it turns north-eastward and, after about 300 miles in a general north-easterly direction, it enters Moçambique at Zumbo, a small settlement at its confluence with the Luangwa river ; the latter river forms the north-western boundary of Portuguese East Africa, and, except for Rio Shiré, is its most important tributary.

Below Zumbo, the river is known as Rio Zambeze, and after flowing about 150 miles in a general easterly direction, it turns south-eastward, and flows in that direction to the sea, receiving Rio Shiré, which flows from the southern end of Lake Nyasa and joins Rio Zambeze about 100 miles from the sea.

Charts 1810, 597, 748a, 2483.

Charts 1810 and 597.

Navigable channel.—Depths.—The navigable channel is subject to constant and rapid changes, and, in the dry season, bears no proportion to the width of the river, which, for about 140 miles above the delta, varies from 5 cables to over 3 miles and is studded with islands in places. The river is only navigable by power vessels of very light draught at any season, and during low river, vessels of a draught of over 18 inches (0^m5), may ground in places.

The navigable portion of the river is divided into two parts by the Quebrabasa (Kebrabasa) rapids (*Lat. 15° 52′ S., Long. 33° 34′ E.*), which necessitate a portage of about 70 miles by road. Massangano, at the lower end of the rapids, is the lower limit of navigation, which commences again at Chicoa and continues beyond Zumbo to the Molele rapids, about 140 miles below Victoria falls; local knowledge is required for the latter part of the navigable portion.

Although the river is usually navigable by stern-wheel vessels between Chinde and the junction of Rio Shiré, a regular service on this route has been discontinued since the completion of the Trans-Zambesia railway, but, during the navigation season, power vessels run between Tete and Vila Bocage on Rio Shiré, about 20 miles above the junction; in 1918, the dimensions of one of these vessels were as follows:—draught, 3 feet (0^m9); length, 147 feet (44^m8); beam, about 30 feet (9^m1), and speed about 12 knots.

The depths in the navigable channel vary so much from season to season that no reliable information can be given. There are, however, more or less permanent shallow places, which are mostly found between the junction of Rio Shiré and Tete, and, at the end of the dry season, between the months of August and early November, for about 15 miles above the junction of Rio Shiré, and also in a portion of the river between Sena and Lupata gorge, the river is hardly navigable for vessels of a draught exceeding one foot (0^m3).

High river and low river.—The first rise after low river begins in November and attains its maximum about the end of December or the beginning of January, a maximum height of 13½ feet (4^m1) having been registered at Tete. The river then falls a few feet until the interior country has been inundated, when the great rise occurs, this being at its highest at Tete in March, and usually amounting to about 20 feet (6^m1), above low river. After March, the river falls very rapidly and does not commence to rise again until November. The rise in Rio Shiré generally occurs at about the same time as in Rio Zambeze, but the rains in the district from which the former river flows, may cause the times of its rise to differ.

Owing to the banks of Rio Zambeze offering little resistance to erosion, the general character of the river in the dry season is comparatively deep reaches separated by shallow bars, the position and depth on which, vary greatly in different years, depending on the lowness of the river and the effects of the previous flood.

Current.—The rise in the river is sudden, and the current at first runs at from 4 to 5 knots, but in a very few days it resumes its usual rate of about 2 knots at Tete (*Lat. 16° 09′ S., Long. 33° 38′ E.*); below Tete, the maximum current is 3½ knots.

During the dry season, the current in Rio Zambeze runs from 1½ to 2 knots, and in the lower part of Rio Shiré, from three-quarters of a knot to 1½ knots.

Chart 2483.

Charts 1810 and 597.

Pilots.—Snags.—Anchorage.—The river pilots are numerous and skilful.

Snags are plentiful and are a constant source of anxiety as each year's flood brings down fresh ones, and, if they are 2 feet (0^m6) below the surface, they show no signs; they are also numerous in Rio Chinde and Rio Shiré, especially in the upper part of the latter river.

Vessels are recommended usually to anchor in mid-stream in preference to near the banks; in early May, however, especially in the lower part of Rio Shiré, anchorage should be sought under the lee of a bend, as large masses of grass, resembling floating islands, are brought down by the current and are liable to trip the anchor if they foul the cable. When the river is in flood, the anchor should be sighted about every 10 days.

Health.—April and May are probably the most unhealthy months in Rio Zambeze and Rio Shiré, when, the rains having ceased, the action of the sun on the decaying vegetation is most active. February and March, the height of the rains, and November, the period of the greatest heat, are also unhealthy. The delta of Rio Zambeze and the lower valley of Rio Shiré, particularly in the neighbourhood of the Morumbala and Elephant marshes, bear the worst character, and the mosquitoes are a terrible plague. The upper valley of Rio Shiré, above the falls, and Lake Nyasa, are less unhealthy, but the climate is always trying to Europeans.

A report from H.M.S. *Herald*, in 1891, on the health of the several places, was as follows: " Katunga, a very unhealthy locality. Chiromo, very fair. Vicente, severe attacks of malarial fever at all seasons. Rio Chinde, no marked unhealthiness, but chills are dangerous; it was healthy and free from fever in September and October, 1890, the maximum temperature at that time being 75°, and the minimum 68° Fahr."

Sir John Kirk remarks: " The best rule for health for men employed afloat in the Zambezi, is to go to bed early, avoid chills at night, have a cup of hot tea, coffee or cocoa in the morning before exposing themselves on deck in the cold morning mists, which chill you to the bone, and on no account permit spirits to be drunk in the middle of the day. Sunset is the time for the men's allowance. Remember that mosquitoes are in millions on the Shiré; I would always anchor in the stream clear of the shore."

General directions.—Distances.—Owing to the constant and rapid changes which occur in the channels, no permanent directions of any value can be given.

The channel crosses and re-crosses from bank to bank and greatly increases the distance which has to be traversed; in these crossings, the channel is always shallower than when it follows the banks, but the shallowest portions are usually fairly well defined by the ripples over them and at their edges, and these ripples are almost the sole guide of the pilot.

As in all river navigation, the general rule is to keep on the outer side of the bends and away from all points, and, at crossings, to keep well up towards the upper bank, more especially when descending the river, as grounding on the lower bank means hours lost in laying out anchors and heaving off.

The following is a summary of a report from H.M.S. *Herald* in

Charts 748a, 2483.

Charts 1810 and 597.

1891 :—The constant change is not confined to the river bed, as large masses of earth are continually falling from the banks into the stream to be carried away and deposited in some position that will astonish the navigator, who, steaming with a certain amount of confidence down a channel which he has found to be fairly permanent, suddenly discovers the vessel to be aground. On a fine calm day, the experienced eye may detect it before too late, but such knowledge is only to be obtained by hard experience.

The approximate distances from the sea to various points on the river are given below, but, in the actual navigation of the river, these distances are very considerably exceeded.

To	Mazaro	75	miles
,,	the junction of Rio Shiré	110	,,
,,	Sena	140	,,
,,	Lupata gorge	235	,,
,,	Tete	280	,,
,,	Quebrabasa rapids	325	,,
,,	Victoria falls	950	,,

Rio Chinde to Rio Shiré entrance.—Numerous villages and trading stations are situated on both banks of the river between the delta and the entrance to Rio Shiré, and a large amount of sugar is cultivated. At Marromeu (*Lat. 18° 17′ S., Long. 35° 54′ E.*), a village on the western bank about 30 miles above the entrance to Rio Chinde, there is a light railway which connects with Murraça. Murraça is situated nearly opposite the entrance to Rio Shiré and was formerly the terminus of the Trans-Zambesia railway, Chindio, on the opposite bank being formerly the southern terminus of the Central African railway. On the completion of the railway bridge in 1935, the Trans-Zambesia and the Central Africa and Nyasaland Railways now form one system.

About 18 miles above Marromeu and on the northern bank, is the village of Mazaro, which, during high river, about February or March, is connected to Quelimane by a boat passage which joins Rio Cuácua and Rio dos Bons Sinais. *See* page 246.

Chart 597.

Rio Shiré entrance to Tete.—In the reach of the river for about 20 miles above the junction of Rio Shiré, there are shallow flats which are more or less permanent, and vessels usually avoid this reach by taking the route round Ilha Inyangoma, a large island situated at the junction of Rio Shiré. The town of Sena, the centre of a large sugar industry, is situated on the southern bank about 30 miles above the junction.

In the reach of about 90 miles between Sena and Lupata gorge, the river is shallow in parts and navigation is reported to be difficult, and in Lupata gorge, a natural cutting about 17 miles in length, care is necessary when the river is in flood, as the current then exceeds 4½ knots ; during low river, the current in the gorge is about 3 knots.

The town of Tete (*Lat. 16° 09′ S., Long. 33° 38′ E.*) stands on the western bank about 45 miles above Lupata gorge. In 1950, the European population was 317 ; a British Consular office is resident.

During the navigation season there is a regular service of power vessels between Tete, Chindio and Vila Bocage.

Tete is connected to the general telegraphic system.

Chart 597.

Tete to Victoria falls.—About 45 miles above Tete, the Quebrabasa rapids form an impassable barrier for about 40 miles, but at Chicoa, a little above these rapids, the river again becomes navigable and continues so to within a little over 100 miles of Victoria falls. This upper reach is more navigable than that between Sena and Tete and can be used by vessels of a draught of from 2 to 2½ feet ($0^{m}6$ to $0^{m}8$), but local experience is required in navigating two rapids.

Rio Shiré.—The Shiré river flows out of the southern end of Lake Nyasa and enters Moçambique close below Port Herald, whence it is known as Rio Shiré ; it enters Rio Zambeze by two channels passing on either side of Ilha Inyangoma, the western channel being known as Rio Ziu Ziu.

Rio Shiré is not navigable by power vessels above Port Herald, and as the greatest rise in the river is reported to be seldom more than 2 feet ($0^{m}6$) above the level of low river, navigation is confined to vessels of very small draught. During the navigation season, there is a regular river service between Vila Bocage, a town on the left bank about 20 miles above the junction, and Tete ; Port Herald, which can be reached in about 12 hours by river from Vila Bocage, is connected to the Trans-Zambesia—Nyasaland railway system.

Rio Ruo, a tributary of the Shiré, forms for some distance the western boundary of Moçambique and joins the Shiré river about 25 miles above Port Herald ; it is navigable by canoes for about 12 miles.

Chart 1810.

PONTA INHAMIARA TO PONTA TANGALANE.—Coast.—Between Ponta Inhamiara, *see* page 236, and the mouth of Rio Bazar (Basar) about 13 miles north-eastward, the coast is so low as to be seldom visible from the deck of a vessel about 7 miles offshore. Between the mouth of Rio Bazar and Ponta Deea (Dehea) (*Lat. 18° 12′ S., Long. 36° 48′ E.*), the southern entrance point of Rio Linde, about 12 miles north-eastward, the coast is slightly higher and more visible, there being some clumps of trees near Ponta Deea, and some sandy cliffs, which, fronted by a long lagoon, are situated a short distance south-westward of the point and a little within the coast ; the cliffs are conspicuous during the forenoon.

The general depths along this stretch of coast are 4 fathoms ($7^{m}3$), about 3 miles offshore, and from 6 to 9 fathoms ($11^{m}0$ to $16^{m}5$), about 5 or 6 miles offshore, but less depths may be expected off the mouths of rivers, and, as the coast has not been closely examined, vessels are recommended not to hug the land in this vicinity.

Rio Linde.—Beacon.—Entrance.—Rio Linde enters the sea through a broad estuary between Ponta Deea and Ponta Samepinguira (Linde), about 2½ miles north-eastward ; Ponta Deea is sandy and is covered with low vegetation, while Ponta Samepinguira has coconut palms on it ; there are numerous islands in the estuary. Rio Mondene, which enters the estuary about 2½ miles north-westward of Ponta Samepinguira, is connected at high tide with Rio dos Bons Sinais and Quelimane by Canal da Chica, *see* page 245. Rio Linde is also connected by channels with Porto do Chinde, via Rio Bazar and Rio Inhamiara. All the commerce with Chinde and Quelimane passes through these channels.

Charts 597, 748a, 2483.

Chart 1810.

A white triangular beacon is situated on Ponta Samepinguira (*Lat. 18° 11′ S., Long. 36° 50′ E.*).

Both entrance points to Rio Linde are fringed with banks which extend as much as 4 miles seaward and whose outer edges are connected by a narrow bar which is subject to change; in 1895, depths of 6 feet ($1^{m}8$) were reported on the bar, and it was stated that Rio Linde had depths of from 2 to 10 fathoms ($3^{m}7$ to $18^{m}3$), for about 50 miles within the entrance. In 1822, Rio Mondene was ascended by boat for about 12 miles, and had depths then of from 5 to 10 fathoms ($9^{m}1$ to $18^{m}3$).

Anchorage.—Pilots.—Anchorage may be obtained in depths of about 4 fathoms ($7^{m}3$), south-eastward of Ponta Deea.

A pilot for Rio Linde may be obtained at the anchorage.

Coast.—Light.—Between Ponta Samepinguira and Ponta da Olinda, the south-western entrance point to Rio dos Bons Sinais, about 10 miles north-eastward, the coast is low and covered with vegetation and there are several sandhills and reddish-coloured patches; a low, but prominent bluff is situated about 2½ miles north-eastward of Ponta Samepinguira. *See* view on chart 650.

Chart 650, plan of Rio dos Bons Sinais.

A light is exhibited, at an elevation of 102 feet ($31^{m}1$), from a red, pyramidal, iron framework tower with white stripes and a white lantern, 88 feet ($26^{m}8$) in height, situated at Vilhena, about 3½ miles south-westward of Ponta da Olinda (*Lat. 18° 03′ S., Long. 36° 56′ E.*).

Vilhena light.
(*Original dated* 1949.)

Entrance to Rio dos Bons Sinais.—Caution.—The entrance to Rio dos Bons Sinais lies between Ponta da Olinda and Ponta Tangalane, about 2¼ miles north-eastward; the land on either side of the entrance is low, sandy and covered with jungle, that near Ponta da Olinda being somewhat the higher. Within the entrance the river is wide and straight for some distance, and when seen from south-south-eastward, the entrance is distinctive, and no land will be seen between the entrance points from the deck of a vessel, though Ilha dos Cavallos Marinhos, about 3 miles within the entrance, may be seen from aloft. *See* view on chart 650.

The entrance points are fringed with extensive banks which are connected by a bar, and there are numerous banks within the entrance. Both the bar and the banks are subject to constant change, the former more especially after south-westerly gales. No reliance should therefore be placed on the depths shown on the chart.

Anchorage.—Current.—Good temporary anchorage may be obtained outside the bar south-westward of the fairway buoy in depths of 5 fathoms ($9^{m}1$), with Vilhena light-tower bearing 286°, distant about 5 miles, but, if remaining any time, better anchorage may be obtained in about the same depth farther north-eastward, where there is reported to be less sea, tidal streams and current.

In the vicinity of the entrance to Rio dos Bons Sinais and outside the bar, the current generally sets south-westward at rates of from one

Chart 650, plan of Rio dos Bons Sinais.

to 2 knots, causing vessels at anchor off the bar to lie broadside to the swell and to roll considerably.

Pilots.—A pilot is available; vessels will be met at the fairway buoy (*see* below) provided previous notice has been given.

Bar.—Depths.—Caution.—Banco dos Cavallos Marinhos extends south-eastward from the coast southward of Ponta da Olinda, and Banco de Tangalane extends southward from Ponta Tangalane; between the outer ends of these banks is the bar, on which, in 1952, the least depth was 10½ feet ($3^{m}2$). No vessel of greater draught than 18 feet ($5^{m}5$) should attempt to cross the bar at springs, or of greater draught than 15 feet ($4^{m}6$), at neaps.

The sea is generally smooth on the bar at high water, but the bar is reported to be impassable if there is a high sea in the offing. Great caution is necessary when crossing the bar in a boat, as the breakers are treacherous, and sometimes a solitary wave will break heavily on the bar where the sea was smooth immediately before; several lives have been lost through this cause.

Beacons. — Buoyage. — Caution. — Two leading beacons stand on the coast northward of Vilhena light-tower, and when in line indicate the approach to the buoyed channel across the bar; the front beacon is a white pyramid, surmounted by a triangle, point down; the rear beacon is a triangle, point up; in 1952, these beacons were in line, bearing 325°.

Two leading beacons also stand north-north-westward of Ponta Tangalane and, in line, they lead through the buoyed channel between the bar and the river entrance; the front beacon is a white triangle, point up, and the rear beacon a white four-sided shield; in 1952, these marks were in line, bearing 355°.

A fairway light-buoy, painted in black and white vertical stripes and exhibiting a *white flashing* light *every ten seconds*, is moored about 5 miles east-south-eastward of Vilhena light-tower in the approaches to the channel across the bar.

The channel across the bar and in the river as far as the anchorage off Quelimane, is marked in accordance with the lateral uniform system of buoyage. *See* page 32.

Within the entrance there are four pairs of ahead and astern leading beacons, which constitute two leading lines.

The beacons and buoys are moved when necessary to meet the constant changes in the bar and in the channels. In 1952, the beacons were reported to be low lying and hard to see.

Islets and dangers within the entrance.—Ilha do Militão, situated about one mile north-westward of Ponta da Olinda, is a sandy island with a few trees on it; Banco do Militão extends eastward from Ilha do Militão. Ilha dos Cavallos Marinhos, situated about 2½ miles northward of Ilha do Militão, is low and covered with dense jungle and has Ilha Cubata (*Lat. 18° 00′ S., Long. 36° 55′ E.*), a small islet close off its southern extremity; Baixo do Simplicio, a detached shoal, lies between Ilha do Militão and Ilha Cubata. Several islets and banks extend northward of Ilha dos Cavallos Marinhos nearly as far as the town of Quelimane, Ilha Rocamba (Recamba), low and covered with dense jungle, being the northern islet. Praia das Gazelas, with a white house and red roof, lies about 7 cables eastward of Ilha dos Cavallos Marinhos.

Charts 1810, 597, 748a, 2483.

Chart 650, plan of Rio dos Bons Sinais.

Channels.—Depths.—Within the bar, the buoyed channel trends northward towards the white leading beacons on the eastern bank and enters the river near Ponta Tangalane, passing between Banco do Militão and the eastern bank of the river and following the latter for about 1½ miles, when it bifurcates. Canal do Militão, the western branch, crosses to the western side of the river, passing northward of Banco do Militão and Ilha do Militão, and southward of Baixo do Simplicio ; it thence follows the western bank of the river, being known as Canal Oeste, as far as Ilha do Nora, about 2¼ miles northward of the northern point of Ilha dos Cavallos Marinhos where it again crosses the river.

In 1952, Canal do Militão was not in use and was not buoyed.

Canal das Moscas or Canal do Leste, which was that in use in 1952, follows the east bank for about 2 miles above Praia das Gazelas to a point where, in 1944, there was, near the foreshore, a prominent wreck, with funnel and masts still standing. From this point the channel crosses to the western bank of the river and joins Canal do Oeste.

Leading beacons, each consisting of a white triangle, point down, are situated on the eastern bank at Praia das Gazelas, and on the western bank about 1½ miles north-westward of the northern extreme of Ilha dos Cavallos Marinhos ; these beacons in line, ahead or astern, lead across the river.

Two pairs of leading beacons, painted white, are situated on the western bank about 1½ miles and one mile respectively south-south-westward of the southern extreme of Ilha do Nora. In 1952, the former, in line ahead bearing 296°, led through the channel northward of Ilha dos Cavallos Marinhos, and the latter, in line astern bearing 220°, led through the deep channel southward of Ilha do Nora. After passing Ilha do Nora the channel trends northward for about 1½ miles and then north-westward to the anchorage off Quelimane (*Lat. 17° 53′ S., Long. 36° 53′ E.*).

Canal da Olinda passes between Ilha do Militão and the western bank of the river, and leads southward of Banco do Militão to the entrance to Canal da Chica, which connects at high water with Rio Linde, *see* page 242 ; Canal da Olinda is not buoyed.

In 1952, the least depth in the river was 12 feet ($3^{m}7$), on the leading line northward of the small island off the north-western extreme of Ilha dos Cavallos Marinhos (*Lat. 17° 58′ S., Long. 36° 54′ E.*).

Tidal streams.—The in-going tidal stream when nearing Ponta Tangalane, sets directly towards the banks on the western side of the river entrance and necessitates great caution. In the river, the tidal streams attain a velocity of about 3 knots.

Anchorages. — Buoys. — Directions. — Anchorage may be obtained near the eastern bank of the river about 2 miles within the entrance and close northward of the commencement of Canal do Militão, and there is anchorage abreast the town of Quelimane in depths of from 12 to 20 feet ($3^{m}7$ to $6^{m}1$). Vessels can also anchor in almost any part of the river.

When approaching Rio do Bons Sinais, vessels should keep from 5 to 6 miles from the coast. Having made the entrance, vessels should not attempt to cross the bar without previous examination unless with local knowledge or with the assistance of a pilot. *See* caution above, with reference to crossing the bar in boats.

Charts 1810, 597, 748a, 2483.

Chart 650, plan of Rio dos Bons Sinais.

Jetties.—Lights.—Three small concrete jetties extend into the river at Quelimane; the usual landing place is at the centre jetty, which has a crane capable of lifting up to 2 tons.

In 1952, a large concrete jetty was under construction, which will be capable of berthing ships up to 17 feet ($5^{m}2$) draught.

A light is exhibited from the inner end of the centre jetty.

A light is exhibited, at an elevation of 28 feet ($8^{m}5$), from a red, iron column at the inner end of the north-western jetty.

Town.—The town of Quelimane is surrounded by coconut palms; the barracks, situated about a quarter of a mile south-eastward of the south-eastern jetty are prominent. The church is a stone building, painted yellow and has two spires.

In 1952, the population of Quelimane was estimated to be over 10,000 of whom about 2,000 were white.

During the year 1933, 120 vessels of an aggregate tonnage of 164,323 tons, entered the port. Vessels up to 8,000 tons have used the port.

There is a general hospital at Quelimane, and a zymotic hospital under a Government medical officer, is maintained outside the town.

There are several lighters at the port of Quelimane (*Lat. 17° 53′ S., Long. 36° 53′ E.*).

Minor repairs to small vessels can be executed.

Communications.—There is regular communication by sea with other East African ports.

There is regular air service with Lourenço Marques via Beira and Inhambane.

Quelimane is connected to the general telegraphic system.

There are short lines of railway which serve the immediate hinterland.

Chart 1810.

Rio dos Bons Sinais above Quelimane.—Above Quelimane, Río dos Bons Sinais trends westward for about 30 miles to Nandoa where it divides into two branches, one branch being known as Rio Cuácua and the other as Rio Lua-lua. Rio Cuácua is connected at high river with the village of Mazaro on Rio Zambeze, *see* page 241.

Rio Licuare joins Rio dos Bons Sinais from northward about 6 miles above Quelimane; the former river is connected with Rio Macuse, by Rio Muselo and Rio Muanange, *see* page 248, and this route is reported to be navigable by vessels of a draught of 6 feet ($1^{m}8$).

Charts 1810, 597, 748a, 2483.

CHAPTER VII

MOCAMBIQUE CHANNEL—PONTA TANGALANE TO CABO DELGADO.

Chart 1810.

PONTA TANGALANE TO PONTA MACALONGA.—Coast.—Off-lying dangers.—Between Ponta Tangalane, described on page 243, and Ponta Matirre, about 87 miles east-north-eastward, the coast is low, sandy and backed by jungle; several rivers enter the sea along this stretch of coast, and, with the exception of the dangers described below, the offshore depths increase regularly and very gradually.

Brisk bank (*Lat. 17° 55′ S., Long. 37° 17′ E.*), a rocky bank on which, in 1859, H.M.S. *Brisk* obtained a sounding of 7 fathoms ($12^{m}8$), but on which the depth may be less, is situated about 19 miles east-north-eastward of Ponta Tangalane and about 9 miles offshore.

Pantaloon shoals, three patches with a least depth of 21 feet ($6^{m}4$), are situated about 29 miles south-south-westward of Ponta Matirre; these shoals are steep-to.

Acorn patch, situated about 20 miles southward of Ponta Matirre, has not been closely examined and should be given a wide berth. In 1840, H.M.S. *Acorn* touched on this patch, and in 1852, H.M.S. *Dart* obtained a sounding of 33 feet ($10^{m}1$) close to it, and observed breakers on the patch; there are depths of from 9 to 13 fathoms ($16^{m}5$ to $23^{m}8$) about one mile southward of the patch.

Chart 1421, plan of Rio Macuse entrance.

Rio Macuse.—Light.—Bar.—Depths.—Rio Macuse enters the sea between Ponta Namerrumo, about 22 miles north-eastward of Ponta Tangalane, and Ponta da Barra, a slight bluff, nearly one mile north-eastward of Ponta Namerrumo.

A light is exhibited, at an elevation of 62 feet ($18^{m}9$), from a red, framework, iron tower with a white stripe and white lantern and balustrade, 61 feet ($18^{m}6$) in height, situated on Ponta Namerrumo.

There is a bar across the entrance to the river, the depths on which are subject to frequent change. In 1951, the least depth on the bar on the leading line was 3 feet ($0^{m}9$). Within the bar the depths increase and, at an anchorage abreast a wharf near Porto Belo, about 2 miles northward of Ponta Namerrumo, there are depths of from 22 to 30 feet ($6^{m}7$ to $9^{m}1$).

In 1904, the river was reported to be navigable by vessels of a draught of 8 feet ($2^{m}4$), for about 25 miles, and by shallow-draught vessels, for about 60 miles.

Leading marks.—Buoys.—The following marks and buoys were in position in 1948.

Charts 597, 748a, 2483.

Chart 1421, plan of Rio Macuse entrance.

The fairway spar-buoy, surmounted by a spherical topmark and painted black with white stripes, was moored about 1½ miles outside the bar in a depth of about 15 feet ($4^{m}6$).

In 1951, a pair of white, pyramidal leading beacons on Ponta Namerrumo, in line bearing 318°, led over the bar; the front beacon was 26 feet ($7^{m}9$) in height, and the rear beacon 43 feet ($13^{m}1$) in height.

A beacon stood on Ponta da Barra.

No. 2 buoy, was moored inside the bar on the western side of the channel, in a depth of 12 feet ($3^{m}7$).

No. 3 red, barrel buoy was moored about half a cable eastward of Ponta Namerrumo, and marked the edge of the shoal ground extending from that point.

Tidal streams.—The in-going tidal stream sets westward on the rising tide and the out-going tidal stream sets eastward on the falling tide; caution is necessary when crossing the bar to guard against the effect of the tidal streams.

Directions.—The following directions were those in use in 1948: Having made the fairway buoy, vessels should cross the bar with the leading marks on Ponta Namerrumo in line, bearing about 327°, and should keep on this mark until close to No. 2 buoy, when course should be altered slightly to starboard, so as to leave No. 3 red, barrel buoy to port whence a mid-river course will lead to the anchorage off the wharf near Porto Belo.

Chart 1810.

Rio Macuse above Porto Belo.—The banks of Rio Macuse are low and covered with palms and mangroves and contain many settlements, of which Maquival, one of the principal ones, stands on the southern bank, about 16 miles above the entrance. Maquival is connected to Quelimane by railway and Rio Macuse is connected to Rio dos Bon Sinais by tributaries; the connecting channel being known as Rio Muselo is described on page 246.

There is regular communication between Porto Belo and other East African ports by coasting vessels.

Coast.—Between Ponta da Barra and the mouth of Rio Licungo, about 7 miles north-eastward, the coast is low and sandy with trees on all the sandhills; north-eastward of the mouth of Rio Licungo, the trees are more scattered and there are many bare sandhills. Rio Licungo is narrow and of little importance, and in 1904, a depth of only 1¼ feet ($0^{m}4$), was reported on the bar across its entrance.

Rio Raraga (*Lat. 17° 28′ S., Long. 37° 41′ E.*) enters the sea, about 23 miles east-north-eastward of the mouth of Rio Licungo, but little is known about this river.

Between the mouths of Rio Raraga and Rio Mazemba, about 22 miles east-north-eastward, the coast continues low and has the appearance of a series of sandflats. In 1924, the bar across the entrance to Rio Mazemba was so shoal that it was fordable at low water, and at times, it appeared unsafe for boats to enter; within the bar, however, there are depths of from 20 to 30 feet ($6^{m}1$ to $9^{m}1$), for about 4 miles. Several rivers flow into Rio Mazemba, with entrances so wide that they are not easily distinguished from Rio Mazemba itself.

Charts 1421, plan of Porto de Pebane, 1810.

Porto de Pebane and approaches.—Light.—Signal station.—The estuary of Rio Moniga, which is known as Porto de Pebane, is

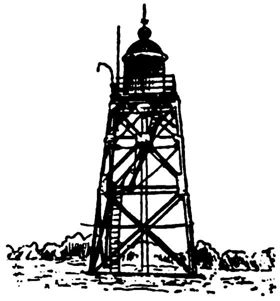
Chart 1810.

situated about 6 miles east-north-eastward of the mouth of Rio Mazemba, the mouths of the two rivers being separated by Ilha Kizungu, northward of which island, they are connected by a channel known as Rio Tejungo. Porto de Pebane is entered between Ponta Monaepa, the eastern extreme of Ilha Kizungu, and Ponta Maverani, about one mile eastward, whence the coast trends east-north-eastward for about 2½ miles to Ponta Matirre, a remarkable bluff, composed of yellow earthy cliffs and fringed with scattered rocks and forming one of the most distinctive features on this part of the coast.

A light is exhibited, at an elevation of 165 feet ($50^{m}3$), from a white, pyramidal framework, iron tower with red bands, 43 feet ($13^{m}1$) in height, situated on Ponta Matirre.

There is a signal station on Ponta Matirre.

The southern coast of Ilha Kizungu is irregular and somewhat higher than the coast on either side, and, taken in conjunction with the bold appearance of Ponta Matirre, renders the entrance to Porto de Pebane easily distinguishable from the entrance to Rio Mazemba ; a military station, situated on the western bank of Rio Moniga, above the entrance to Rio Tejungo, is noticeable.


Ponta Matirre lighthouse from eastward.
(*Original dated* 1949.)

Both entrance points to Porto de Pebane are covered with trees ; the appearance of the coast in this vicinity, is, however, subject to change. Within the coast, there is fine open country with numerous indications of the existence of big game.

Chart 1421, plan of Porto de Pebane.

Entrance channel.—Depths.—Both entrance points to Porto de Pebane are fronted by extensive banks, which, in 1948, had extended further than charted. Banco de Monaepa, which dries, extends about 1¾ miles south-eastward of Ponta Monaepa, and a bank, on which the depths are less than 3 fathoms ($5^{m}5$), extends over 2 miles southward of Ponta Maverani. The outer ends of these banks are connected by a bar, on which the sea breaks continually when the swell is from the southward and which, in 1951, had a least depth of about 8 feet ($2^{m}4$) between the Fairway and No. 2 buoys, in a channel across it ; the bar, however, is subject to frequent changes. In 1953, depths of 10 feet ($3^{m}1$) were found close northward of the Fairway buoy. Within the bar, the depths increase, and there are depths of from 33 to 54 feet ($10^{m}1$ to $16^{m}5$) in the fairway of a channel leading to an anchorage abreast the town of Pebane, which is situated on the eastern bank of Rio Moniga, about 2 miles northward of Ponta Maverani (*Lat. 17° 17′ S., Long. 38° 09′ E.*).

There are depths of from 19 to 30 feet ($5^{m}8$ to $9^{m}1$) in a narrow channel leading into Rio Tejungo, which passes close northward of Ponta Monaepa, but the depths decrease to about 8 feet ($2^{m}4$), about 1¼ miles westward of Ponta Monaepa.

Above the anchorage abreast the town of Pebane, the depths in Rio Moniga decrease considerably, but in 1875, the river was reported to be navigable by dhows for about 20 miles.

Charts 597, 748a, 2483.

Chart 1421, plan of Porto de Pebane.

Leading marks.—Buoys.—Caution.—In 1951, two white triangular marks, the front one point up and the rear one point down, were situated on Ponta Maverani.

In 1948, a leading mark, painted in black and white stripes, was situated on Ponta Monaepa; this mark, bearing 295°, led across the bar.

A pair of leading beacons, consisting of two white, triangular marks, points down, are situated in the vicinity of Praia de Mutaranini, on the western side of the river, about 1½ miles north-north-westward of Ponta Monaepa; these beacons form No. 2 leading line and, in 1951, their alignment was 322°.

Chart 1421, Porto de Pebane.

The Fairway spar buoy, surmounted by a spherical topmark, and painted in black and white stripes, is moored about 3¼ miles east-south-eastward of Ponta Monaepa (*Lat. 17° 17′ S., Long. 38° 08′ E.*).

No. 2 buoy lies on the bar, and it and the Fairway buoy, in line bearing 295°, form an alignment with the leading mark on Ponta Monaepa.

No. 1 black cylindrical buoy is moored within the bar, and marks the edge of the shoal which extends from Ponta Maverani.

The channel across the bar is buoyed in accordance with the uniform lateral system. *See* page 32.

The buoys and leading marks are moved as necessary.

Directions.—The following directions were in force in 1951:—Vessels should approach the Fairway buoy from the southward with Ponta Matirre light bearing 000° and cross the bar with No. 2 buoy and the leading marks on Ponta Maverani in line bearing 309°. Having made No. 2 buoy, a vessel should then leave the alignment and proceed towards No. 1 buoy. After passing No. 1 buoy, course should be altered to the alignment of the leading beacons forming No. 2 leading line bearing 322°; this alignment should be maintained until all the left bank of the river is visible, when course should be altered northward towards the anchorage. Local knowledge is necessary for entering the harbour.

Town.—Pebane had, in 1950, a European population of 60. There is a hospital.

Communications.—There is regular communication by sea with other East African ports.

Chart 1810.

Coast.—Off-lying danger.—Between Ponta Matirre and Cabo Tocorro, about 6 miles east-north-eastward, the coast is low and is broken by the mouth of Rio Melai, which enters the sea about 3 miles north-eastward of Ponta Matirre and is easily identified. Cabo Tocorro is a distinctive bluff, formed of red earth cliffs, and has at its foot a sandy beach on which are a few rocks. Between Cabo Tocorro and Ponta M'sulo, the western entrance point to Rio Moebase, about 22 miles east-north-eastward, there is a well-wooded stretch of coast through which Rio Melela enters the sea through a delta which extends from 10 to 6 miles westward of Ponta M'sulo.

Rio Yuse, the western mouth of Rio Melela, was, in 1904, reported to have a depth of 6½ feet ($2^{m}0$) on the bar across its entrance. Within the entrance, there is anchorage for a small vessel, in depths of 14 feet ($4^{m}3$), mud, off the village of Yuse, which may be identified by a white house. A few small coasting vessels visit Yuse, but, unless with local

Chart 1810.

knowledge, no vessel should attempt to cross the bar without previous examination. The tidal streams attain a velocity of from 4 to 5 knots in the entrance during springs; the bar is reported to be smoother during the period of the in-going tidal stream.

The main mouth of Rio Melela, about 3½ miles east-north-eastward of the mouth of Rio Yuse, has a bar which extends about 4½ cables seaward of the entrance; in 1904, there were depths of 5 feet ($1^{m}5$) on the bar. The channel across the bar is narrow and tortuous, and anchorage off the river is not recommended. Little is known of Rio Melela except that it is connected by inland waterways, navigable by boats, to Rio Moebase and also to Rio Moma, which is entered about 60 miles north-eastward.

David shoals (*Lat. 17° 30′ S., Long. 38° 34′ E.*) are two rocky patches lying about 23 miles south-eastward of Ponta Matirre. There is a least depth of 21 feet ($6^{m}4$) on the north-eastern, and of 48 feet ($14^{m}6$) on the south-western patch; both patches are steep-to.

Rio Moebase.—Entrance.—Caution.—Depths.—Rio Moebase is entered between Ponta M'sulo and Ponta Almandia about one mile east-south-eastward. The western bank of the river is low and marshy, and intersected by numerous mangrove-bordered creeks, but the eastern bank is high and the country northward of the entrance is covered with dense jungle. The entrance may be identified by some avenues of casuarina trees, standing on the eastern bank of the river near the old village of Moebase, about one mile north-westward of Ponta Almandia, and by a single isolated casuarina tree, which, in 1937, stood close within the latter point. The town is connected to Porto de Pebane by telegraph.

There is a bar across the entrance, the position of, and depths on which, are subject to frequent changes; the river should be entered with extreme caution and then only with a pilot.

In 1948, shoal water existed about midway between the Fairway buoy and the first red barrel buoy, and depths decreased rapidly to about 6 feet ($1^{m}8$) in this vicinity, which position is also that of the narrowest part of the bar channel. The latest information should be obtained from the Port Captain's office at Quelimane.

Leading marks.—Buoys.—The following marks and buoys were in position in 1951:—Two triangular marks, painted white, stood on the beach in the vicinity of Ponta Almandia; these marks in line bearing 325°, defined the entrance channel.

A fairway spar buoy, surmounted by a spherical topmark and painted in black and white stripes, was moored southward of the bar, in a depth of about 26 feet ($7^{m}9$), about 1½ miles southward of Ponta Almandia.

No. 1 black barrel buoy surmounted by a topmark, was moored in a depth of 13 feet ($4^{m}0$), on the leading line off the edge of the bank eastward of the bar.

No. 2 red barrel buoy, was moored in a depth of about 12 feet ($3^{m}7$) on the alignment of the Fairway buoy and the white marks.

A black barrel buoy, surmounted by a topmark, moored in the river in a depth of 9 feet ($2^{m}7$), marked the edge of Banco da Ponta Caçoane.

Directions.—Having made the Fairway buoy, the river should be entered on the alignment of that buoy and the white marks on Ponta Almandia (*Lat. 17° 04′ S., Long. 38° 41′ E.*). On reaching No. 1 buoy,

Charts 597, 748a, 2483.

Chart 1810.

steer for two isolated casuarina trees on Ilha Monaco until the rear triangular leading mark is on the starboard quarter. When past the second barrel buoy, course should be altered to port for the anchorage abreast the old village, passing westward of the black barrel buoy marking the edge of Banco da Ponta Caçoane.

Tidal streams.—Anchorage.—The tidal streams, especially the out-going stream, are reported to be very strong in the channel between the entrance points.

Anchorage may be obtained abreast the old village of Moebase, in depths of from 18 to 28 feet ($5^{m}5$ to $8^{m}5$).

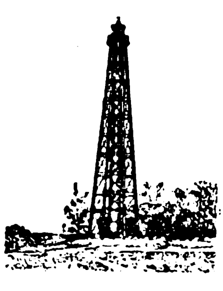
Coast.—Danger.—Between Ponta Almandia and the mouth of Rio Moloqué, about 6½ miles eastward, the coast continues to be well wooded, but its aspect thence gradually changes to sandy hummocks, covered with thick clumps of bushes, and, from about 4 miles eastward of the mouth of Rio Moloqué to Ponta Macalonga, a low, sandy point, about 11 miles farther east-north-eastward, the coast consists of low, bare sandhills with a few scattered trees.

Rio Moarenha enters the sea about 6½ miles east-north-eastward of the mouth of Rio Moloqué, but little is known of these rivers, the mouths of both being closed by bars which nearly dry; near the mouth of Rio Moarenha, there is a very distinct red cliff.

Ponta Macalonga is fronted by a bank on which the depths are irregular and between 3 and 5 fathoms ($5^{m}5$ and $9^{m}1$), which extends as much as 4 miles southward of the point. The bank is covered by a *green* sector of Ilha do Fogo light between the bearings of 222° and 229°.

Ilhas das Primeira.—Lights.—Anchorages.—Ilhas das Primeira are a chain of islets and reefs which lie, at distances of from 5 to 12 miles offshore, on the outer edge of a coral bank which fronts the coast between Ponta Almandia and Ponta Macalonga.

Ilha Silva (*Lat. 17° 16′ S., Long. 38° 48′ E.*), the south-westernmost of the chain, lies about 13 miles south-south-eastward of Ponta Almandia. It consists of a rock and coral reef, nearly circular in shape and about one mile in diameter, on the northern part of which, is a hummock of sand and broken shells; the position of the hummock changes slightly during storms, and it is covered at high water springs.



Ilha do Fogo lighthouse from north-westward.
(*Original dated* 1949.)

A *red* sector of Ilha do Fogo light covers Ilha Silva and the surrounding reef between the bearings of 050° and 070°.

Ilha do Fogo lies about 5½ miles north-eastward of Ilha Silva; it is composed of sand, and is about 10 feet ($3^{m}0$) high, with a few trees, about 65 feet ($19^{m}8$) high, on its northern part, the remainder of the island being covered with scrub. It is surrounded by reefs, which dry in patches, and extend as much as one mile southward of the island.

A light is exhibited, at an elevation of 119 feet ($36^{m}3$), from a dark red, octagonal, framework tower, 121 feet ($36^{m}8$) in height, situated on the eastern part of Ilha do Fogo.

Anchorage may be obtained, in depths of from 5 to 6 fathoms ($9^{m}1$ to $11^{m}0$), about 5 cables off the western side of Ilha do Fogo, or, in depths of 10 fathoms ($18^{m}3$), at 3 or 4 cables offshore, with the centre

Charts 597, 748a, 2483.

Chart 1810.

of the island bearing from 156° to 178°. When approaching the anchorage from northward, the depths suddenly increase from 10 to about 20 fathoms ($18^{m}3$ to $36^{m}6$), about 1½ miles offshore, and rapidly decrease again to 10 fathoms ($18^{m}3$), about 5 cables offshore.

Ilha Corôa is about 20 feet ($6^{m}1$) high, sandy and sparsely covered with grass; it lies about 4½ miles north-eastward of Ilha do Fogo, and there are depths of from 10 to 16 fathoms ($18^{m}3$ to $29^{m}3$) in the channel separating it from the latter island, and depths of from 8 to 13 fathoms ($14^{m}6$ to $23^{m}8$) in the channel separating it from Ilha Casuarina.

Ilha Casuarina, which lies about 8½ miles north-eastward of Ilha Corôa, is covered with casuarina trees, about 80 feet ($24^{m}4$) in height, and can be identified from a considerable distance. Except on its north-western side, it is surrounded by reefs, which extend between 2 and 3 miles offshore.

Ilha Epidendron is situated about 3 miles north-eastward of Ilha Casuarina, and about 5¼ miles south-south-eastward of Ponta Macalonga; it may be seen from a distance of about 15 miles, and, like Ilha Casuarina, is surrounded by extensive reefs, except on its north-western side. There is, however, a clear passage, about one mile in width, with a least depth of 6 fathoms ($11^{m}0$), between the latter reefs and those extending north-eastward of Ilha Casuarina.

A light (*Lat. 17° 05′ S., Long. 39° 07′ E.*) is exhibited, at an elevation of 72 feet ($21^{m}9$), from a red, framework, iron tower 47 feet ($14^{m}3$) in height, situated near the north-western extreme of Ilha Epidendron.

Anchorage may be obtained, in depths of from 4 to 11 fathoms ($7^{m}3$ to $20^{m}1$), off the north-western side of Ilha Epidendron, about 3 cables offshore; the depths decrease to 16 feet ($4^{m}9$) or less, at 2 cables offshore.

Ilha Casuarina and Ilha Epidendron are covered by a ***red*** sector of Ilha do Fogo light, between the bearings of 234° and 247°.

Baixo Barraco is a dangerous reef of rock and coral, lying about 3 miles north-eastward of Ilha Epidendron; a detached rocky patch, with a least depth of 28 feet ($8^{m}5$), which breaks during southerly gales, lies about one mile south-eastward of Baixo Barraco, and there are two rocky patches, with least depths of 41 feet ($12^{m}5$), about 5 and 8½ miles, respectively, north-eastward of Ilha Epidendron. Baixo Barraco and the two northern rocky patches, are covered by the ***red*** sector of Ilha Epidendron light between the bearings of 230° and 250°.

Casuarina road.—Current.—Casuarina road, situated between Ilha Casuarina and the mainland, is sheltered from south-eastward by Ilha Casuarina and Ilha Epidendron and from north-eastward by the bank extending southward of Ponta Macalonga, and affords the best anchorage on this part of the coast. Anchorage may be obtained, in depths of 11 fathoms ($20^{m}1$) about 8 cables offshore, or in depths of 21 feet ($6^{m}4$), about 5 cables offshore, with the centre of Ilha Casuarina bearing about 135°.

A current setting south-westward is usually experienced in Casuarina road, but a north-easterly set occasionally occurs.

Directions.—Vessels approaching Casuarina road from north-eastward should keep Ilha Casuarina bearing about 220° and open northward of Ilha Epidendron lighthouse, in order to pass northward of Baixo Barraco; the depths are regular.

At night, vessels should keep in the ***white*** sector of Ilha Epidendron

Charts 597, 748a, 2483.

Chart 1810.

light, and northward of the *red* sector which covers Baixo Barraco between the bearings of 230° and 250°; and should also keep in the narrow *white* sector of Ilha do Fogo light, which shows between the bearings of 229° and 234°, and leads through the channel between Ilha Epidendron and the edge of the bank extending southward of Ponta Macalonga. Caution is necessary, however, as the distance from the latter light is near its limit of visibility.

PONTA MACALONGA TO PONTA SANCÚL.—Ponta Macalonga to Porto de António Énes.—Aspect.—Between Ponta Macalonga and the entrance to Porto de António Énes, about 68 miles north-eastward, the coast is moderately low, covered with grass and detached clumps of casuarina trees, and is fringed by sandy beaches. Within the coast, Serra de Matadane, a chain of hills which reaches an elevation of 1,100 feet ($335^{m}3$), stretches north-eastward between the mouths of Rio Moma and Rio Larde, which enter the sea about 17 miles and 47 miles, respectively, north-eastward of Ponta Macalonga. Monte Pilipi, a prominent hill, 295 feet ($89^{m}9$) high, stands about one mile within the coast, about 6 miles south-westward of the mouth of Rio Larde, and is visible from a considerable distance seaward, while Mount Cockburn, a distinctive conical mountain, situated about 27 miles northward of Ponta Macalonga, is the only mountain visible off this part of the coast.

Coast.—Rio Naburi and Rio Ligonha enter the sea about 5½ and 8 miles, respectively, north-eastward of Ponta Macalonga. Rio Naburi formerly afforded anchorage to small vessels in a narrow space within its entrance, which was approached through a buoyed channel, but the entrance channel has silted and, in 1937, there were depths of only one foot ($0^{m}3$) on the bar at the entrance to Rio Naburi, and the entrance to Rio Ligonha also nearly dried.

Chart 1421, plan of Barra and Porto de Moma.

Porto de Moma.—Entrance.—The southern entrance point to Porto de Moma is formed by a narrow tongue of land which fronts Ilha Mutirrane (*Lat. 16° 47′ S., Long. 39° 15′ E.*), a small island about 17 miles north-eastward of Ponta Macalonga; Ponta Nicota, the northern entrance point, is the south-western extreme of a similar tongue which runs parallel with the coast about three-quarters of a mile northward. Within the entrance, there is a wide estuary formed by the confluence of Rio Moma from westward and Rio Cocola from northward, but a large part of the estuary is encumbered with banks which partly dry. The town and military station of Moma is situated about 2½ miles north-westward of Ilha Mutirrane, near the extreme of a tongue of land which separates Rio Moma from Rio Cocola. The entrance to Rio Moma is almost completely obstructed by Baixo Marrebo, an extensive bank which dries in places, leaving only a narrow and shoal channel into the river, but there is a comparatively deep channel into Rio Cocola, and anchorage may be obtained in the latter river abreast Nacalaua, a village on the eastern bank, about 2½ miles northward of Ilha Mutirrane.

Bar.—Depths.—Banco de Mutirrane and Banco de Nicota extend nearly 2 miles eastward of Ilha Mutirrane and Ponta Nicota, respectively, and at their outer edges, are connected by a broad bar, the position of, and depths on, which, are subject to frequent changes.

Chart 1421, plan of Barra and Porto de Moma.
In 1949, there was a least depth of about 3 feet (0^{m}9) in the channel across the bar, and entry should only be attempted in very good weather. Within the bar, the depths increase and, in 1937, there was a least depth of 10 feet (3^{m}0) in the channel which passes between Banco de Mutirrane and Banco de Nicota, whence it follows the eastern bank of Rio Cocola to the anchorage off Nacalaua.

There is also a narrow anchorage off the town of Moma, which is approached through a tortuous channel between drying sandbanks; in 1936, there was a least depth of 3 feet (0^{m}9) in this channel.

Buoys.—Beacon.—The fairway buoy, a spar buoy, painted in black and white stripes and surmounted by a St. George's cross, is moored in the approach to the bar.

The channel between the bar and the anchorage off Nacalaua, is marked by six buoys, which are in accordance with the uniform lateral system of buoyage, *see* page 32. The starboard hand buoys are odd-numbered and painted black with conical topmarks, and the port hand buoys are even-numbered and painted red with cylindrical topmarks.

Cocola beacon, a concrete pillar, painted in black and red horizontal bands and surmounted by a ball, stands on a drying reef, situated close to the eastern bank of Rio Cocola, about 2 cables southward of the anchorage off Nacalaua.

Tidal streams.—Pilot.—Town.—The tidal streams run very strongly in the entrance channel.

The maritime delegate at Porto de António Énes is the pilot for Porto de Moma. A motor pilot vessel is always available at Porto de Moma and its services are indispensable.

Porto de Moma had, in 1950, a European population of under 100.

There is a hospital.

Porto de Moma (*Lat. 16° 46′ S., Long. 39° 13′ E.*) is connected to the general telegraphic system.

Caution.—Owing to constant variations in depths on the bar, the port should not be entered or sailed from by vessels drawing more than 9 feet (2^{m}7) without giving previous notice to the port authorities. The bar is dangerous in a southerly wind.

Chart 1810.

Outer anchorage.—In August, 1875, H.M.S. *Thetis* anchored off the entrance to Porto de Moma, in a depth of 9 fathoms (16^{m}5), sand and mud, and good holding ground, with Mount Cockburn bearing 308° and Ponta Caldeira, described below, bearing 047°. The current at this season always sets south-westward along the coast at varying strengths, and, as there was a heavy rolling sea from southward, which at times had the character of rollers on a bar, the ship lay broadside to the swell, and rolled heavily.

Coast.—Light.—From Ponta Nicota, described on page 254, the coast trends north-eastward for about 16 miles to Ponta Caldeira, a point which is somewhat higher than the adjacent coast.

A shoal, with a depth of 31 feet (9^{m}4) over it, lies about 4½ miles south-westward of Ponta Caldeira lighthouse.

A light (*Lat. 16° 40′ S., Long. 39° 30′ E.*) is exhibited, at an elevation of 164 feet (50^{m}0), from an octagonal tower, the upper part of which is painted white and the lower part red, 89 feet (27^{m}1) in height,

Charts 1810, 597, 748a, 2483.

Chart 1810.

situated on a sandhill near Ponta Caldeira. The keepers' dwellings are on either side of the lighthouse and are painted white.

Ponta Caldeira lighthouse from south-eastward.

(*Original dated* 1949.)

Between Ponta Caldeira and Ponta Masiuane, about 27 miles north-eastward, Rio Larde, Rio M'Luli and Rio Quilúa all enter the sea through a marshy lagoon lying close within the coast, through which there are boat channels. Rio Larde which enters the sea about 15 miles north-eastward of Ponta Caldeira, has within its mouth a narrow basin in which small vessels may obtain shelter ; in 1935, there was a least depth of one foot (0^m3) on the bar across its entrance. The mouth of Rio M'Luli is situated about 5 miles north-eastward of the mouth of Rio Larde.

Rio Quilúa enters the sea close southward of Ponta Masiuane, and is connected with Porto de António Énes by Canal de Quilúa, which is reported to be available for vessels of a draught of 7 feet (2^m1). Within the entrance, there is good sheltered anchorage off Menuca, a village close within the southern entrance point ; the anchorage is much used by coasting vessels. In 1935, there was a least depth of 7 feet (2^m1) in the channel across the bar, but the channel is narrow, and vessels are recommended to enter at low water, when the edges of the shoals are visible. Native pilots for Rio Quilúa, Rio M'Luli and Rio Larde, may be obtained at Porto de António Énes.

Ponta Masiuane is the south-eastern extreme of Ilha de Angoche, an island intersected by numerous creeks and fronted by partly drying banks and islets, which extend for about 8½ miles northward and form the southern entrance point to Porto de António Énes. Ponta Masiuane is low, white and sandy, and is fringed with a partly drying bank which extends as much as one mile south-eastward, outside which, the sea breaks off the bar at the mouth of Rio Quilúa, about 1½ miles south-eastward of Ponta Masiuane.

Ilhas de Angoche.—Light.—Anchorages.—Ilhas de Angoche are a chain of islets and shoals which are situated between 3½ and 8 miles offshore, near the outer edge of a bank which fronts the coast between Porto de Moma and Porto de António Énes. As the trees on these and similar islets are very useful in making the islets from seaward, it is very desirable that they should not be cut down or otherwise damaged.

Ilha de Moma, the southernmost of the islets, lies about 9 miles southward of Ponta Caldeira ; it is about 15 feet (4^m6) high and sandy, and, except on its north-western side, is surrounded by reefs which extend as much as 1¼ miles south-eastward.

A 34-foot (10^m4) patch of rock and coral lies about 6½ miles south-westward of Ilha de Moma.

A 33-foot (10^m1) patch lies about 3 miles northward of Ilha de Moma.

Between Ilha de Moma (*Lat. 16° 49′ S., Long. 39° 31′ E.*) and Ilha Caldeira, about 15 miles north-eastward, the depths are very irregular ; a patch, on which there is a least depth of 19 feet (5^m8), lies about 3 miles south-westward of Ilha Caldeira, and there is a 33-foot (10^m1) patch, about 5½ miles south-westward of Ilha Caldeira.

Ilha Caldeira is sandy and there are a few casuarina trees on it ;

Charts 597, 748a, 2483.

Chart 1810.

except on its northern side, it is surrounded by reefs which extend as much as a mile north-eastward and southward of the island. Moderately good anchorage may be obtained, in depths of about 8 fathoms ($14^{m}6$), coral, sand and mud, about 7 or 8 cables north-westward of Ilha Caldeira.

Ilha N'Jovo, situated about 6½ miles north-eastward of Ilha Caldeira, is low, sandy and covered with trees, and, except on its northern side, is surrounded by reefs which extend as much as 1½ miles southward. Anchorage, sheltered from southerly and south-easterly winds, may be obtained about 2 cables north-westward of the island, in depths of from 6½ to 8 fathoms ($11^{m}9$ to $14^{m}6$).

Baixo Miguel, situated about 5 miles north-eastward of Ilha N'Jovo, is a dangerous, drying reef; it should be given a wide berth. A depth of 11 feet ($3^{m}3$) lies about 7 cables northward of Baixo Miguel.

Ilha Puga-Puga is a small, sandy islet, about 6 or 8 feet ($1^{m}8$ to $2^{m}4$) high, situated about 3½ miles south-eastward of Ponta Masiuane; except on its north-western side, it is surrounded by reefs, which extend as much as 1½ miles south-eastward. Caution is necessary when using the channel between Ilha Puga-Puga and Ponta Masiuane at night, as the bank extending south-eastward of Ponta Masiuane and the breakers off the bar of Rio Quilúa, contract the width of the navigable channel to little over 1½ miles.

Ilha Puga-Puga and Baixo Miguel are covered by a *red* sector of Ilha de Mafamede light, between the bearings of 029° and 049°.

Ilha de Mafamede, lying about 7½ miles north-eastward of Ilha Puga-Puga, is low and sandy, but has on it a group of casuarina trees, which may be seen from a considerable distance. Except on its northern side, where the coast is moderately steep-to and the landing is good, it is surrounded by reefs, which extend as much as 1½ miles north-eastward and southward of the island.

A shoal, with a depth of 34 feet ($10^{m}4$) over it, lies about 2 miles north-north-westward of Ilha de Mafamede lighthouse.

Ilha de Mafamede lighthouse.
(*Original dated* 1949.)

A light is exhibited, at an elevation of 82 feet ($25^{m}0$) from a white, hexagonal, concrete tower, 82 feet ($25^{m}0$) in height, situated near the northern coast of the island.

Anchorage may be obtained in depths of 6 fathoms ($11^{m}0$) with the lighthouse bearing 150°, distant 4 cables.

Chart 1421, plan of Porto de António Énes.

Porto de António Énes.—Aspect.—Porto de António Énes is entered between Jabire and Ilha do Buzio islands on the northern edge of the banks which front Ilha de Angoche, situated about 8½ miles northward of Ponta Masiuane, and Ponta Namacoto, a slight projection on the coast nearly 2½ miles north-eastward. On the southern side of the entrance, there are casuarina trees on Ilha do Buzio and other off-lying islets, and the northern part of Ilha de Angoche is covered with large trees, among which there are several villages visible from seaward which extend as far southward as Ponta Masiuane. On the northern side of the entrance, the coast is somewhat higher and consists of a low, sandy cliff, the top of which is fringed with trees. The town of António Énes (*Lat. 16° 14' S., Long. 39° 54' E.*) is situated

Charts 597, 748a, 2483.

Chart 1421, plan of Porto de António Énes.

on the northern side of the harbour, about 4½ miles within the entrance; it is built on the slope of a hill which, when seen from seaward, appears to be the end of a high ridge extending north-eastward for about 15 miles to the mouth of Rio Sangage.

Channels.—Depths.—The approach to the entrance is obstructed by numerous banks and shoals which extend over 4 miles eastward of Ilha do Buzio and are joined by a bar, the channels through which are subject to frequent changes; unless with local experience, no vessel should attempt to enter the harbour without a pilot. In 1953, there was a least depth of 11½ feet ($3^{m}5$) in the main channel across the bar, which is known as Canal do Norte (*Lat. 16° 14′ S., Long. 40° 01′ E.*).

Within the bar, the depths increase, and there are depths of from 30 to 65 feet ($9^{m}1$ to $19^{m}8$) in the channel between the bar and a point where the channel divides, about 2 miles north-westward of Ilha do Buzio, and depths of from 21 to 30 feet ($6^{m}4$ to $9^{m}1$) at an anchorage about 2½ miles north-westward of Ilha do Buzio and abreast the town of António Énes; above this anchorage, the channel continues northward for about 2 miles, whence it divides into three channels and the depths decrease considerably.

Canal de Quilúa commences close westward of Ilha do Buzio and trends westward along the north-western side of Ilha de Angoche, with a least depth of 21 feet ($6^{m}4$), for about 4 miles above Ilha do Buzio, whence it connects with Rio Quilúa, and is reported to be available to vessels of a draught of 7 feet ($2^{m}1$).

At the western end of Ilha do Buzio, there is a sheltered area with smooth water, where boats can lie alongside a steep sandy beach, in a depth of 3 fathoms ($5^{m}5$).

Canal do Sul is a channel across the bar between the sandbanks about 3 miles eastward of Jabire, but, in 1953, was no longer buoyed.

Beacon.—Buoys.—Caution.—A triangular beacon stands on the southern part of Baixo Monico, a rocky patch which dries, situated on the western side of the entrance to the channel leading to the anchorage off the town, about 2 miles north-westward of Ilha do Buzio; a rock, which dries, lies one cable southward of Baixo Monico.

The fairway buoy, a spar buoy, painted in black and white vertical stripes and surmounted by a St. George's cross topmark, is moored eastward of the bar in the approach to Canal do Norte, and the channel, as far as the anchorage off the town of António Énes, is marked by buoys, which are in accordance with the uniform lateral system of buoyage, *see* page 32.

The positions of the buoys are constantly shifted to mark the frequent changes in the bar and channels.

Signal station.—Pilots.—There is a signal station on a hill at Parapato, about 6 cables north-eastward of the town of António Énes.

Pilotage is compulsory for merchant vessels. Pilots will board vessels off Ilha de Mafamede, if advised by telegraph.

Anchorages.—There is anchorage off the town of António Énes in depths of 22 to 23 feet ($6^{m}7$ to $7^{m}0$); the anchorage for men-of-war is northward, and for merchant vessels is southward of the landing pier abreast the town. Vessels in quarantine anchor northward of the men-of-war anchorage as directed by the Port Authorities.

Directions.—Should it be considered necessary to examine the bar before entering, caution is necessary, as this is dangerous at times.

Charts 1810, 597, 748a, 2483.

Chart 1421, plan of Porto de António Énes.

Ilha de Mafamede lighthouse astern, bearing 193°, leads to the entrance to Canal do Norte, whence the fairway buoy may be passed on either side and the bar crossed by the buoyed channel, after which, vessels should keep in mid-channel between the buoys, to the anchorage off António Énes, keeping eastward of Baixo Monico beacon. A mark for anchoring is given by the mast of the signal station at Parapato in line with the Harbour master's boat house at the root of the landing pier, bearing 057°.

Town.—António Énes (*Lat. 16° 14′ S., Long. 39° 54′ E.*) is the principal Portuguese settlement in the district, and is the residence of a military commandant. A fort and barracks are situated on the slopes of the hill north-eastward of the town. Medical assistance is available.

There is a landing pier abreast the town, but it dries alongside at low water.

Fresh provisions may be obtained, and water from springs near the town is reported to be good.

In 1946, 69 coastal vessels entered the port.

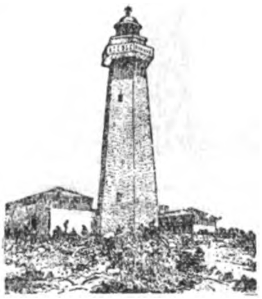
Communications.—There is regular communication by sea with other East African ports.

António Énes is connected to the general telegraphic system.

Chart 1810.

Coast.—Light.—Off-lying dangers.—Between Ponta Namacoto, described on page 257, and the entrance to Rio Sangage, about 19 miles north-eastward, the coast is backed by a ridge of high land, which increases gradually in elevation, being from 300 to 400 feet (91^{m}4 to 121^{m}9) in the vicinity of the river mouth; on the ridge are several patches of red sand, and the vegetation becomes less dense as the entrance to Rio Sangage is approached. The entrance may be identified by the north-eastern entrance point, a low and sandy point, backed by sandhills partly covered with vegetation, which forms a striking contrast to two rocky points, situated about 4 and 5 miles, respectively, southward of the entrance.

A light is exhibited, at an elevation of 306 feet (93^{m}3), from a hexagonal, concrete tower, painted in red and white horizontal bands, 85 feet (25^{m}9) in height, situated about 1¾ miles southward of the southern entrance point to Rio Sangage.



Sangage lighthouse from eastward.
(*Original dated* 1949.)

Baixo de Santo Antonio, a dangerous reef which dries in parts and is steep-to, lies about 7 miles offshore, about 12½ miles southward of Sangage lighthouse; it is covered by a *red* sector of Ilha de Mafamede light between the bearings of 206° and 221°.

Baixo Namuali, a shoal with a least depth of 9 feet (2^{m}7), lies about 3 miles offshore, about 8¾ miles south-south-westward of Sangage lighthouse; a 4-fathom (7^{m}3) patch, lies about 2 miles east-north-eastward of Baixo Namuali.

Baixo Nantapa, a 25-foot (7^{m}6) patch, and Baixo Sangage, a patch with a least depth of 32 feet (9^{m}8), lie about 5¾ miles south-eastward, and 9½ miles east-south-eastward, respectively, of Sangage lighthouse.

Charts 597, 748a, 2483.

Chart 1421, plan of Baía de Sangage.

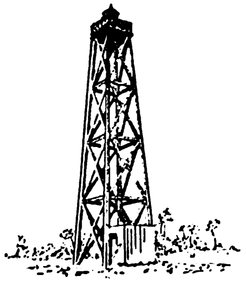
Rio Sangage entrance.—Depths.—Baía de Sangage, also known as Foz do Rio Sangage, is entered between Ponta Djuma (South point), about 1¾ miles northward of Sangage lighthouse, and Ponta Selela (North point), about 1¼ miles northward. Both entrance points are fronted by drying banks which extend as much as 2½ miles eastward, and are connected by a bar, the position of, and depths on, which, are probably subject to considerable change.

According to the Portuguese chart, in 1933, there was a least depth of 6 feet ($1^{m}8$), in a channel across the bar which passes close to the bank fronting Ponta Selela. Within the bar, the depths increase, and there are depths of from 10 to 26 feet ($3^{m}0$ to $7^{m}9$), in a narrow channel, which passes close to the southern bank, for about 3 miles within the entrance.

Chart 1810.

Coast.—Light.—Off-lying dangers.—Between the mouths of Rio Sangage and Rio Meige, about 8½ miles north-eastward, the coast is low, partly covered with trees and fringed by a sandy beach. The village of Quinga (*Lat. 15° 51′ S., Long. 40° 14′ E.*) stands near the northern entrance point to Rio Meige, and, with a small bluff on the southern bank of the river, may assist in identifying the entrance, which is very narrow.

The sandy beach extends for about 10 miles north-eastward of the mouth of Rio Meige, whence the coast is fringed with rocks as far as Ponta Namalungo, a well-wooded sandy bluff, about 17½ miles north-eastward of the mouth of Rio Meige. Viewed from seaward, Ponta Namalungo appears to be backed by moderately high land, while the adjacent coast is low, sandy and covered with casuarina trees.



Ponta Namalungo lighthouse.
(*Original dated* 1949.)

A light is exhibited, at an elevation of 275 feet ($83^{m}8$) from a white, quadrangular, framework, concrete tower, 62 feet ($18^{m}9$) in height, situated about half a mile south-westward of Ponta Namalungo.

Baixo Quinga, a shoal with a least depth of 26 feet ($7^{m}9$), lies about 13 miles eastward of Sangage lighthouse.

Baixo Mussibarinde, a shoal with a least depth of 21 feet ($6^{m}4$), lies about 11 miles east-north-eastward of Sangage lighthouse.

Baixo Mecade, with a least depth of 7 feet ($2^{m}1$), lies about 5¼ miles offshore, and about 11½ miles southward of Ponta Namalungo lighthouse; a 23-foot ($7^{m}0$) patch, lies about 2¼ miles offshore, about 3½ miles northward of Baixo Mecade.

Baixo Namaete, with a least depth of 16 feet ($4^{m}4$), lies about 6¾ miles south-south-eastward of Ponta Namalungo lighthouse.

Ponta Namalungo to Ponta Bajone.—Aspect.—Off-lying dangers.—Between Ponta Namalungo and Ponta Bajone, about 28 miles north-eastward, the coast is fronted by a mangrove swamp, on the outer edge of which, a chain of islands and islets stand on a drying bank. Several of the islets are covered with casuarina trees. Rio Mogincual enters the south-western corner of the swamp through moderately high banks, and may be identified by the military station of Santa Barbara, which stands in a clearing on the northern bank of

Charts 597, 748a, 2483.

Chart 1810.

the river, about 5 miles northward of Ponta Namalungo lighthouse, and from seaward appears as a conspicuous reddish-coloured patch. Ponta Bajone is the eastern extreme of a low, sandy island, shaped like a bow and covered with trees, which stands at the north-eastern end of the mangrove swamp.

The offshore depths, within about 4 miles of the chain of islets, are most irregular, and the bottom is rocky, with several dangerous shoals, on some of which the sea generally breaks heavily.

Baixo Mucalanga and Baixo Chataputa are two rocky patches, lying near the edge of a 5-fathom ($9^{m}1$) bank, which extends about 2 miles off the chain of islets, about 8 miles east-north-eastward of Ponta Namalungo lighthouse (*Lat. 15° 38′ S., Long. 40° 25′ E.*) ; there is a least depth of one fathom ($1^{m}8$) on Baixo Mucalanga, and of 2 feet ($0^{m}6$) on Baixo Chataputa and the sea generally breaks on these shoals.

Baixo Infusse, a rocky shoal with a least depth of 15 feet ($4^{m}6$), lies about 13 miles east-north-eastward of Ponta Namalungo lighthouse, and about 3½ miles offshore ; a 32-foot ($9^{m}8$) patch lies about 3 miles northward of Baixo Infusse. There are depths of from 6½ to 12 fathoms ($11^{m}9$ to $21^{m}9$) in the channel between Baixo Infusse and the bank on which is Baixo Chataputa, but the depths are very irregular. In 1875, H.M.S. *Thetis* anchored about one mile eastward of Baixo Infusse, in a depth of 15 fathoms ($27^{m}4$) hard sand ; in this position, the vessel swung regularly to the tidal streams, that of the rising tide setting northward, and that of the falling tide, southward.

Baixos do Brugi are several shoal patches, with a least depth of 9 feet ($2^{m}7$), which lie near the outer edge of a 5-fathom ($9^{m}1$) bank, which extends over 3 miles from the chain of islets about 9 miles south-south-westward of Ponta Bajone ; a pinnacle rock, with a depth of 2 fathoms ($3^{m}7$) over it, lies about 2 miles north-eastward of Baixos do Brugi.

Baixo Namezaco, a sandy patch which dries, and on which the sea breaks heavily, lies near the edge of a 5-fathom ($9^{m}1$) shore bank, about 6½ miles southward of Ponta Bajone.

Baixos Quanzi, several detached shoal patches, with a least depth of 7 feet ($2^{m}1$), on which the sea generally breaks, lie as much as 2 miles offshore, about 2½ miles southward of Ponta Bajone.

Chart 653, Mokambo, Mozambique and Conducia.

Baía de Mocambo.—Dangers.—Baía de Mocambo (Mokambo), the approach to Porto de Mocambo, is entered between Ponta Bajone and Ponta Sancúl, about 10½ miles northward ; there are several casuarina trees on Ponta Sancúl, and some prominent rocks lie on the beach about three-quarters of a mile south-south-westward of the point.

Between Ponta Bajone and Ponta Quitxundulo (Kitandulo) (*Lat. 15° 09′ S., Long. 40° 37′ E.*), about 7 miles north-north-westward, the south-western shore of the bay is free from dangers outside one mile from the coast ; near the gap between the mainland and the island on which is Ponta Bajone, about 3 miles north-westward of the latter point, there is a small reddish-coloured cliff, which stands out prominently from the surrounding dark green vegetation.

Baixo Nanzaco (Mudge reef), a coral spit on which there is a least depth of one fathom ($1^{m}8$), extends as much as three-quarters of a

Charts 2762, 597, 748a, 748b, 2483.

Chart 653, Mokambo, Mozambique and Conducia.

mile northward of Ponta Quitxundulo; its northern and western edges are steep-to. It is reported that Baixo Nanzaco can be readily distinguished by the difference in the colour of the water over it.

From Ponta Sancúl for about 4½ miles westward, the northern shore of the bay is fronted by a drying coral reef, which extends nearly 1½ miles offshore, the southern edge of which is steep-to; from the western edge of this bank to Ponta Fugo (Ras Fugu), about 4¾ miles west-south-westward, there are no dangers outside three-quarters of a mile from the coast.

Porto de Mocambo.—Dangers.—Porto de Mocambo, which is entered between Ponta Quitxundulo and Ponta Fugo, about 2 miles westward, affords sheltered anchorage in a large area, in which there are depths of from 6 to 16 fathoms ($11^{m}0$ to $29^{m}3$), but the western part of the harbour is encumbered with numerous shoals.

Within the entrance, the southern side of the harbour, which is somewhat lower than the northern side, is extensively cultivated with coconut plantations, and there are numerous villages, the most important being Quivolane (Kivolani), about 3 miles southward of Ponta Fugo, and Lunga, in the south-western corner of the harbour, about 4¼ miles south-westward of Ponta Fugo.

Ponta Fugo, the northern entrance point, is the southern extreme of a low, sandy island, lying on the edge of a mangrove swamp, at the mouth of Rio Monapo (Monabo). The northern side of the harbour is moderately high, and its shore is fringed with mangroves in places. Monte de Muchelia, a hill with three peaks, situated about 1½ miles north-westward of Ponta Fugo on the western bank of Rio Namarrimela the western mouth of Rio Monapo, is the most conspicuous landmark; the village of Muchelia is situated on the slopes of Monte de Muchelia.

At the head of the harbour, an estuary is formed by the confluence of Rio Montomonho (Mundomonho) and Rio Mitiquite, which together enter the south-western corner of Porto de Mocambo between Ponta Mutaboa, the northern extreme of a narrow peninsula on which is the village of Lunga, and Ponta Lopo, about 4 cables northward; in 1934, there were depths of from one foot to 11 feet ($0^{m}3$ to $3^{m}3$) within the estuary.

Quipúa, a detached coral patch, with a least depth of 4 feet ($1^{m}2$) is situated in the entrance to the harbour, about 9 cables south-south-westward of Ponta Fugo; the patch is steep-to.

Ponta Quitxundulo (*Lat. 15° 09′ S., Long. 40° 37′ E.*) is the northern extreme of a sandy island on which are a few casuarina trees; the island and the adjacent coast are fronted with drying sandy banks, which extend about a quarter of a mile offshore, within which, a mangrove swamp extends for about 2½ miles west-south-westward to Ponta Calajulo, the western extreme of a drying coral spit, which projects about half a mile westward of the coast.

Between Ponta Calajulo and Ponta Mutaboa, about 4 miles west-south-westward, the southern part of the harbour is encumbered with banks and shoals which extend as much as 1½ miles offshore, but, about one mile westward of Quivolane, there is an area free from dangers, where anchorage may be obtained.

Between Ponta Calajulo and the village of Quivolane, about 1¾ miles southward, there is a small bay which is almost completely filled with banks and shoals, on which the depths are less than 21 feet ($6^{m}4$).

Charts 1810, 2762, 597, 748a, 748b, 2483.

Chart 653, Mokambo, Mozambique and Conducia.

A 5-fathom (9^{m}1) bank fronts the coast from 1¾ miles westward of Quivolane to the south-western corner of the harbour, and extends about 1½ miles offshore; Quanzi, with a depth of 7 feet (2^{m}1), and Namelungue, with a depth of 8 feet (2^{m}4), lie on this bank, about 1¼ and 1¾ miles, respectively, eastward of Ponta Mutaboa.

Between Ponta Fugo and Ponta Muacula (Muakula), the southern extreme of a rocky spit which projects about half a mile southward from the northern shore, about 2½ miles westward, there is a bay which is free from dangers at its centre, but within half a mile of Ponta Muacula, it is foul, and there is a detached rock, which dries, about 8 cables east-north-eastward of Ponta Muacula.

Between Ponta Muacula and Ponta Lopo, about 2½ miles south-south-westward, the north-western shore of the harbour is fringed with rocks and shoals, and the depths are very irregular.

Mecirro and Puanculo are parts of a coral reef, which dries in places, situated about 1½ miles east-north-eastward of Ponta Lopo; two detached patches of 23 feet (7^{m}0) and 25 feet (7^{m}6), lie about half a mile north-eastward of the reef.

Anchorage.—Anchorage may be obtained about 3 cables off the northern shore, in depths of from 39 to 51 feet (11^{m}9 to 15^{m}5) with Ponta Fugo bearing 120°, distant about 1½ miles, or about 5 cables off the southern shore, in depths of 10 fathoms (18^{m}3), with the drying extreme of Ponta Calajulo bearing 031°, distant about 2 miles, but anchorage may be obtained in any part of the harbour which is clear of danger.

Directions.—Vessels should approach the entrance steering for Monte de Muchelia, bearing 270°, and when a prominent white building at Lunga (*Lat. 15° 11′ S., Long. 40° 31′ E.*) bears about 243°, it should be steered for on that bearing, passing about 2 cables off Ponta Fugo, which is steep-to, whence course may be shaped for the selected anchorage; care must be taken to avoid Quipúa.

Supplies.—Fresh provisions may be obtained at most of the villages.

Chart 653, Mozambique harbour and Mokambo, Mozambique and Conducia.

PORTO DE MOÇAMBIQUE AND APPROACHES.—Current.—Porto de Moçambique (Mozambique) is entered between Ponta Sancúl and Cabo da Cabaceira, a low, wooded bluff, about 6 miles north-eastward. Ilha de Moçambique, on which is the town of that name, is situated close within the entrance points, and although parts of the harbour are encumbered with banks and shoals, there is sheltered anchorage for a large number of vessels, in depths of from 19 to 90 feet (5^{m}8 to 27^{m}4), north-westward of Ilha de Moçambique.

For about 10 miles on either side of the harbour the land is low, but Cabo Condúcia, about 6 miles northward of Ilha de Moçambique, may be identified by its cliffs, 200 feet (61^{m}0) high, with reddish-coloured patches, which stand out clearly from the surrounding dark green vegetation. On Ilha de Moçambique, Fortaleza de São Sebastião, and the white spire of São Paulo church, about 4 cables westward of the fort, are conspicuous, and the lighthouse on Ilha de Gôa, about 3 miles south-eastward of Ilha de Moçambique, is also conspicuous from seaward.

Charts 1810, 1809, 2762, 597, 748a, 748b, 2483.

Chart 1809.

In clear weather, the harbour may be identified by Monte Pão and Monte Mesa, both about 970 feet (295^{m}7) high, situated about 23 miles north-westward and 18 miles northward, respectively, of Ilha de Moçambique; the former, which is not often visible from seaward, resembles a small, round-topped hill, surmounting a larger one, and the latter has a long, flat summit, which rises from a longer flat-topped ridge, but, at some distance from it, only its upper part is visible, and it appears as a flat island.

A current setting south-westward along the coast is usually experienced off Porto de Moçambique, its outer limit being from 50 to 80 miles from the coast. Its velocity varies with the monsoons, but it attains a rate of 4 knots during the strength of the north-east monsoon. As shown in the table on page 16, the mean drift of the Moçambique current between latitudes 10° S., and 26° S., is weakest in June and July, being 8 and 7 miles per day, respectively. At this time, the current off Porto de Moçambique may sometimes be inappreciable, and close inshore, a countercurrent may be experienced.

Chart 653, Mozambique harbour.

Islands and dangers in approach.—Light.—Ilha de Sena is a small, wooded island, about 4 miles eastward of Ponta Sancúl. The drying coral reef which fronts the northern shore of Baía de Mocambo, extends eastward to Ilha de Sena, leaving only a few narrow channels in which the depths are less than 2 fathoms (3^{m}7); the sea generally breaks heavily on the southern edge of the reef between Ponta Sancúl and Ilha de Sena.

Ilha de Gôa (*Lat. 15° 03′ S., Long. 40° 47′ E.*), which separates the two approach channels to the harbour, is a bare, flat coral island, lying about 1½ miles north-north-eastward of Ilha de Sena. It is surrounded by a reef which extends as much as 3 cables offshore in places, and the only landing place is at a steep sandy beach on its north-western side; landing is not possible during fresh north-easterly winds.

A light is exhibited, at an elevation of 98 feet (29^{m}9), from a black, square, masonry tower with white bands, 102 feet (31^{m}1) in height, on the light-keeper's dwelling, situated on the south-eastern side of Ilha de Gôa. This light is also visible from the air.

Banco do Sul, a detached shoal bank with a least depth of 15 feet (4^{m}6), lies about one mile westward of Ilha de Gôa.

Ilha de Gôa lighthouse from south-eastward.
(*Orignal dated* 1949.)

A reef of rocks and coral, which dries in parts, is situated nearly 1½ miles eastward of Cabo da Cabaceira, and extends from about 2 miles north-eastward of that cape to about 1½ miles northward of Ilha de Gôa. On the northern part of this reef and near its eastern edge, are Ilha dos Sete Paus, Ilha Injaca (Inyaka) and Ilha Injaca Pequêna; Ilha dos Sete Paus, the northernmost islet on the reef, has a group of casuarina trees at its northern end.

Porto de Moçambique.—Light.—Dangers.—Beacons.—Between Ponta Sancúl and Ponta Quisumba (Kisumbo), about 2½ miles northward, the coast is sandy and low, being only from 14 to 17 feet

Charts 1810, 2762, 597, 748a, 748b, 2483.

Chart 653, Mozambique harbour.

($4^{m}3$ to $5^{m}2$) high, and is covered inland with palms and mango trees. About 2½ miles north-westward of Ponta Quisumba, and close to the head of the harbour, is the village of Lumbo, abreast which, there is an embarkation pier. Close northward of Lumbo, the head of the harbour divides into three creeks, of which Lumbo and Calombo (Kalombo) creeks are the two southernmost, and Mossuril (Mossoril) creek, the northernmost ; the shores of these creeks are covered with mangroves, and, with the exception of Calombo creek, they dry at low water.

A beacon, consisting of three crosses, painted white and disposed vertically, stands on the coast about 2 miles north-north-westward of Ponta Sancúl.

A light is exhibited from the head of the pier at Lumbo.

Between Ponta Sancúl and Lumbo, the south-western side of the harbour is fringed by Sancúl sands, which dry and which extend as much as 1½ miles offshore at Banco de Sancúl, a projecting spit about 1½ miles east-south-eastward of Ponta Quisumba.

Banco de São Lourenço is an extensive coral bank, on which the depths are less than 3 fathoms ($5^{m}5$), which fronts Sancúl sands and extends over 2¾ miles east-north-eastward of Ponta Sancúl.

Banco do Lumbo, a bank on which the depths are less than 2 fathoms ($3^{m}7$), extends over one mile northward of Ponta Quisumba.

Ponta da Cabaceira, the southern extreme of a narrow island, lying about 1¼ miles south-south-westward of Cabo da Cabaceira, is covered with trees, and there are a few detached rocks near the point. It is fringed with a drying coral reef which extends nearly one mile southward and terminates in Harpshell spits ; these spits show clearly at low water, and may sometimes be distinguished at high water.

Between Ponta da Cabaceira and Ponta Mapêta (*Lat. 14° 59′ S., Long. 40° 41′ E.*), about 5½ miles west-north-westward the north-western shore of the harbour is bordered by mangroves and fronted by a vast drying sandbank, the eastern part of which is called Harpshell sands and the western part, Mapêta sands. There are a few detached rocks southward of Ponta São João, about 1½ miles north-westward of Ponta da Cabaceira, but the sands are generally free from stones and white in colour.

Banco do Norte, a bank on which the depths are less than 3 fathoms ($5^{m}5$), which fringes Harpshell spits, extends as much as 1¼ miles south-south-eastward of Ponta da Cabaceira.

Banco do Murengulo, a bank on which the depths are less than 5 fathoms ($9^{m}1$), extends about half a mile southward of Harpshell sands, about 3 miles westward of Ponta da Cabaceira.

Banco de Mapêta, a bank on which the depths are less than 3 fathoms ($5^{m}5$), extends about a quarter of a mile southward of Mapêta sands, about one mile south-south-eastward of Ponta Mapêta.

Cabaceira beacon, a stone pillar, painted in red and white horizontal bands, about 19 feet ($5^{m}8$) in height, stands on a detached rock about one cable southward of Ponta da Cabaceira.

São João, a red, masonry pillar, 11 feet ($3^{m}4$) in height, stands on a detached rock about 6 cables south-south-westward of Ponta São João.

Murengulo beacon stands on Harpshell sands, close to the mangroves bordering the shore, about 1½ miles west-north-westward of Ponta São João.

Charts 1810, 1809, 2762, 597, 748a, 748b, 2483.

Chart 653, Mozambique harbour.

Ilha de Moçambique.—Signal station.—Lights.—Off-lying danger.—Ilha de Moçambique is a low, coral island lying between Ponta Sancúl and Ponta da Cabaceira; except on its north-western side, the island is fringed with drying coral reefs which extend nearly half a mile offshore. Fortaleza de São Sebastião stands on its north-eastern end and a fort stands on Ilheu de São Lourenço, an islet on the edge of the surrounding coral reef, about 1½ cables southward of the south-western extreme of Ilha de Moçambique.

A signal station, with which vessels can communicate by the International Code of Signals, is situated on the Post office in the town; storm signals are displayed at the signal station.

A light is exhibited, at an elevation of 9 feet (2^m7), from the white, masonry, tide gauge structure at the head of the Custom House pier, situated about 4 cables westward of Fortaleza de São Sebastião.

A light is exhibited, at an elevation of 9 feet (2^m7), from a white building, situated on the northern side of the centre part of the Custom House pier.

A light is exhibited, at an elevation of 49 feet (14^m9), from an iron turret on the Harbour offices, about 2 cables south-westward of the roof of the Custom House pier.

Banco Leven, with a least depth of 8 feet (2^m4), lies off the north-western side of Ilha de Moçambique, about 4 cables north-westward of Fortaleza de São Sebastião (*Lat. 15° 02′ S., Long. 40° 45′ E.*).

Channels.—Depths.—Lights.—The harbour is entered by Canal da Fortaleza de São Sebastião, a channel between the reef fringing Fortaleza de São Sebastião and Harpshell spits, in which the depths are more than 10 fathoms (18^m3); there are depths of only 9 feet (2^m7) in the channel between the south-western extreme of Ilha de Moçambique and Banco de Sancúl. Canal da Fortaleza de São Sebastião may be approached by Canal do Sul, which passes between Ilha de Sena and Ilha de Gôa, or by Canal do Norte, which passes between Ilha de Gôa and Banco do Norte.

The depths in the fairway of Canal do Sul are from 10 to 24 fathoms (18^m3 to 43^m9), but the channel is narrow and tortuous, there being only 3 cables between the western extreme of Banco do Sul and the eastern extreme of Banco de São Lourenço.

The least depth in the fairway of Canal do Norte was 32½ feet (9^m9) in 1948, and the navigable channel between the reefs northward of Ilha de Gôa (*Lat. 15° 03′ S., Long. 40° 47′ E.*) and Banco do Norte, is over three-quarters of a mile in width.

Leading lights are established for Canal do Norte. The front light is exhibited, at an elevation of 9 feet (2^m7), from a white, rectangular, iron structure, surmounted by a white triangle, situated close southward of Fortaleza de São Lourenço. The rear light is exhibited, at an elevation of 68 feet (20^m7), from a white, rectangular, iron structure, 52 feet (15^m8) in height, situated on the coast, nearly 1½ miles north-westward of Ponta Sancúl. These lights in line, bearing 260°, lead from seaward through the fairway of Canal do Norte.

Leading lights are established for Canal da Fortaleza de São Sebastião. The front light is exhibited, at an elevation of 45 feet (13^m7), from an iron framework pillar 46 feet (14^m0) in height, situated on the northern side of Ilha de Gôa. The rear light is the light in Ilha de Gôa lighthouse, which is described on page 264. These lights in line, bearing

127°, lead as a sternmark from the line of the leading lights for Canal do Norte, through the fairway of Canal da Fortaleza de São Sebastião.

Buoyage.—The channels and dangers are buoyed in accordance with the uniform lateral system, *see* page 32.

Canal do Norte.—Fairway light-buoy, painted in red and white stripes, and surmounted by a cylindrical topmark, and exhibiting a *red flashing* light *every four seconds* is moored on the southern side of the channel, about three-quarters of a mile north-north-eastward of Ilha de Gôa lighthouse (*Lat. 15° 03′ S., Long. 40° 47′ E.*).

Canal da Fortaleza de São Sebastião and Harbour.—No. 2 pillar light-buoy, painted red, and exhibiting a *red group flashing* light, showing *two* flashes *every five seconds,* is moored on the south-western side of the entrance, close off the reef fringing Fortaleza de São Sebastião.

No. 1 pillar light-buoy, painted black, and exhibiting a *green group flashing* light, showing *two* flashes *every five seconds,* is moored on the north-eastern side of the entrance, opposite No. 2 light-buoy.

No. 4, a pillar buoy, painted red with white bands, and surmounted by a cylindrical topmark, is moored on the south-western side of the channel, off the eastern extreme of Banco Leven.

No. 6, a red pillar buoy, surmounted by a cylindrical topmark, is moored off the northern extreme of Banco Leven.

No 3, a black pillar buoy, surmounted by a conical topmark, marks the southern extreme of Banco do Murengulo.

No. 8, a red pillar buoy, surmounted by a cylindrical topmark, marks the northern extreme of Banco do Lumbo.

No. 5, a black pillar buoy, surmounted by a conical topmark, marks the southern extreme of Banco de Mapêta (*Lat. 15° 00′ S., Long. 40° 41′ E.*).

Pilots.—Pilotage is compulsory for merchant vessels ; two Government pilots are available. The pilot boards vessels off Ilha de Gôa at the entrance of the channel and vessels may enter by day or night.

Tidal streams.—The in-going tidal stream sets westward on the rising tide, and the out-going tidal stream sets eastward on the falling tide ; both in-going and out-going tidal streams are very strong at springs.

Anchorages.—An anchorage, reserved for men-of-war of light draught, the eastern and western limits of which, are indicated on the chart by pecked lines, lies between the eastern end of Ilha de Moçambique and Banco Leven ; men-of-war of greater draught should anchor on the alignment of the leading lights on Ilha de Gôa, or northward of a line between Nos. 4 and 6 buoys. Men-of-war anchoring in their reserved anchorage should leave a clear channel, for merchant vessels to pass, southward of Banco Leven.

Merchant vessels of light draught should anchor between the western limit of the man-of-war anchorage and the eastern limit of the quarantine and explosives anchorage, and north-eastward of a line joining the light-structure at the Harbour office and the head of the pier at Lumbo ; those of greater draught should anchor, on the alignment of the leading lights on Ilha de Gôa, northward of a line passing through the head of the Custom House pier and the northern corner of Fortaleza de São Sebastião and south-eastward of a line between the head of the Custom House pier and São João beacon. When available, anchorage should be taken at the intersection of the alignments of the leading lights on Ilha de Gôa and of the lights on the Custom House pier and at the Harbour office.

The Quarantine and Explosives anchorage, indicated on the chart by pecked lines, lies northward and eastward of Ponta Quisumba.

Directions.—Vessels from northward should make the land well northward of Porto de Moçambique, especially during the north-east monsoon.

Vessels from southward should guard against an indraught into Baía de Mocambo.

Except in the case of small vessels, Canal do Norte should be used for entering Porto de Moçambique. Vessels should approach Canal do Norte steering for the light-beacon on Ilheu São Lourenço in line with the light-structure on the coast northward of Ponta Sancúl, bearing 260°, and should keep on this mark until Ilha de Gôa lighthouse (*Lat. 15° 03′ S., Long. 40° 47′ E.*) is in line with the light-beacon north-westward of it, bearing 127°, when these marks should be used as a stern-mark, and course should be altered to 307° which will lead through Canal da Fortaleza de São Sebastião passing between the light-buoys, whence the selected anchorage may be taken up.

If using Canal do Sul, vessels should approach with the south-western corner of the fort on Ilheu de São Lourenço in line with the beacon, consisting of three white crosses, on the coast southward of Ponta Quisumba, bearing 284°. They should keep on this mark until Ponta da Cabaceira beacon bears 010°, when course should be altered to 000°, taking care to keep Cabaceira chapel bearing less than 345° and open eastward of São João beacon, which will lead eastward of Banco de São Lourenço until the line of the leading mark for Canal da Fortaleza de São Sebastião is reached.

If proceeding to the anchorage between Ilha de Moçambique and Leven bank, caution is necessary when passing between Fortaleza de São Sebastião and No. 4 buoy during the period of the in-going tidal stream, as the latter sets towards the bank.

Port facilities.—The Custom House pier, which is the usual landing place, projects about one cable from the shore on the north-western side of Ilha de Moçambique, and there is a least depth of 4 feet ($1^{m}2$) alongside its end.

Vessels discharge into lighters and barges ; a 2-ton steam crane is available on shore.

There is an old wooden pier, with a least depth of 6 feet ($1^{m}8$) alongside, which projects about 1½ cables from the shore at Lumbo (*Lat. 15° 00′ S., Long. 40° 40′ E.*). At the head of the pier is a floating pontoon with a least depth of 6 feet ($1^{m}8$) alongside. A single-track railway runs the length of the pier, with a direct connection to the main line.

About 15 small tugs of varying horse-power are available and there are about six privately-owned launches.

Two 10-ton cranes, one 5-ton and one 2-ton crane are available at Lumbo.

Supplies.—No stocks of coal or fuel oil are maintained.

A very small quantity of diesel oil is available.

Fresh provisions are available in small quantities only. Water is scarce, and is only supplied to shipping in cases of emergency.

Town.—Moçambique covers the greater part of Ilha de Moçam-

Chart 653, Mozambique harbour.

bique, but the palace of the Governor-General is a large building at Cabaceira, on the mainland. The climate is unhealthy, malarial and bilious fevers being prevalent.

There is a good general hospital in the town.

A British Consular officer is resident.

In 1945, the population was 9,147, of whom 586 were Europeans.

In 1933, 108 ocean-going vessels of an aggregate tonnage of 802,949 tons, entered the port, and there is, in addition, a considerable coasting trade.

Storm signals.—The following storm signals are shown at the Post office on Ilha de Moçambique, on information being received by cable from Mojanda in Madagascar.

First signal. *By day.*—A black cone, point up, displayed at each yard-arm ; one gun fired.
By night.—A *red* light, exhibited at each yard-arm ; one gun fired.
Signification :—Cyclone in Moçambique channel.

Second signal. *By day.*—A black ball, displayed at each yard-arm ; two guns fired.
By night.—Two *red* lights, exhibited at one yard-arm and one *red* light at the other ; two guns fired.
Signification :—Cyclone is approaching Moçambique. Small craft are to proceed to safety at Mossuril.

Final signal. *By day.*—A black cylinder, displayed at each yard-arm.
By night.—A *red* light exhibited at one yard-arm, and a *green* light at the other.
Signification :—Storm has passed away.

Communications.—There is regular communication by sea with India, South Africa and intermediate ports, and also with other East African ports.

A railway, which will connect Moçambique with Nyasaland, is under construction ; its seaward terminus is at Lumbo (*Lat. 15° 00′ S., Long. 40° 40′ E.*), and, in 1951, 312 miles had been completed and was in operation as far as Cuamba. A branch line has been built to connect with Nacala.

Moçambique is connected to the general telegraphic system, and is connected to Madagascar and Mauritius by submarine cable.

There is regular air service with Europe and South Africa via East African ports.

There is a radio station at Moçambique, *see* page 35.

Climatic table.—*See* page 73.

Chart 653, Mokambo, Mozambique and Condúcia.

CABO DA CABACEIRA TO CABO CULUMULOMO.—Baía da Condúcia.—Dangers.—Baía da Condúcia is entered between Cabo da Cabaceira, described on page 263, and Ponta Quifinga (Kifinga) about 8 miles northward. The depths in the entrance are irregular, but near the centre of the bay, anchorage may be obtained, in depths of from 6 to 9 fathoms (11^{m}0 to 16^{m}5), the approach to the anchorage being through a channel, about 3 cables wide, with depths of from about 11 to 18 fathoms (20^{m}1 to 32^{m}9). Westward of the anchorage the depths decrease, there being a least depth of 19 feet (5^{m}8) near the entrance to Rio Sanhute, at the head of the bay. Vessels of moderate draught may obtain anchorage in Rio Sanhute, in depths of from 21 to 48 feet (6^{m}4 to 14^{m}6) in a narrow area, about one mile above the entrance, which is approached across a bar, on which there is a least depth of 2 fathoms (3^{m}7).

Between Cabo da Cabaceira and the conspicuous cliffs of Cabo Condúcia, described on page 263, about 4 miles north-north-westward the coast is low, sandy and covered with trees. Between Cabo Condúcia and the village of Quissangua (Kisanga), about 6 miles west-north-westward at the head of the bay, are the villages of Chuca, Condúcia and Saua-Saua ; of these, Condúcia is situated on an island fronting a bay which is filled by a drying bank, partly covered with mangroves.

A bank on which the depths are less than 5 fathoms (9^{m}1), fronts the coast between Cabo da Cabaceira and Cabo Condúcia, and extends over 2 miles offshore in places ; westward of Cabo Condúcia, depths of less than 3 fathoms (5^{m}5), extend about one mile off the southern shore of the bay.

Ponta Quifinga is the southern extreme of Ilha Jamali, a narrow coral island, about 20 feet (6^{m}1) high, with steep and overhanging extremes, which is covered with grass and shrubs and ringed with mangroves on its western side. Ilha Jamali forms the eastern edge of an extensive, drying, coral reef which fronts the northern side of the bay, and extends over 4 miles west-south-westward of Ponta Quifinga. Ilha Sombreiro or Quissangula (Kisangula), a rocky islet, 10 or 12 feet (3^{m}0 or 3^{m}7) high, is situated near the southern edge of this reef, about 3½ miles west-south-westward of Ponta Quifinga ; there are a few baobab trees on the islet.

From Ponta Chicoma (Chikoma), a rocky projection about 2¾ miles westward of Ponta Quifinga, the northern shore of the bay trends west-south-westward for about 2¼ miles to the village of Onifuconiculo ; the conspicuous military station of Chicoma (Chikoma) lies about half a mile westward of Ponta Chicoma. Between Onifuconiculo and Ponta Uiuia (Euia), a narrow sandspit, about 5 miles west-south-westward, sparsely covered with shrubs and forming the eastern entrance point to Rio Sanhute, the northern shore of the bay is fringed with mangroves and is fronted by a drying sandbank which extends from one to 6 cables offshore.

A bank, on which the depths are less than 6 fathoms (11^{m}0) and very irregular, extends as much as 1¼ miles southward of Ilha Sombreiro.

Anchorages.—Anchorage may be obtained, in depths of from 6 to 9 fathoms (11^{m}0 to 16^{m}5), mud, with Ponta Quifinga (*Lat. 14° 52′ S., Long. 40° 49′ E.*) in line with the northern end of Ilha Sombreiro bearing 072°, at from 2½ to 4½ miles distant from the islet. Cabo da Cabaceira in line with Cabo Condúcia, bearing about 150°, gives a mark for the outer anchorage, and a mark for the inner anchorage is given by the northern extreme of Ilha dos Sete Paus in line with Cabo Condúcia, bearing about 125°.

Vessels of moderate draught may obtain anchorage within the bar of Rio Sanhute, anywhere in mid-river up to half a mile above the bar.

Directions.—Vessels from southward should pass not less than half a mile off Ilha dos Sete Paus, and when the northern extreme of that island bears about 218°, course should be shaped about 315°

Chart 653, Mokambo, Mozambique and Condúcia.

to pass about 1½ miles off Cabo Condúcia until Ponta Chicoma is in line with Ilha Sombreiro, bearing about 015°; course should thence be shaped about 286° for the outer anchorage, and anchorage obtained with Ponta Quifinga in line with the northern end of Ilha Sombreiro, bearing 072°.

Vessels from northward should pass about one mile off Ponta Quifinga, whence course should be shaped as necessary, being guided by the chart, for a position about 1½ miles southward of Ilha Sombreiro; from this position, course may be shaped about 286° for the anchorage, and anchorage obtained as directed above.

Supplies.—Limited supplies of fresh provisions may be obtained from the villages within Baía da Condúcia.

Porto Velhaco.—Porto Velhaco is entered between Ponta Prata, the north-eastern extreme of Ilha Jamali, about 1½ miles northward of Ponta Quifinga, and Ponta Napenja, which projects from the mainland about 6 cables northward; the sea nearly always breaks heavily close to Ponta Napenja. With the exception of a small area close within the entrance, in which there are depths of 22 feet ($6^{m}7$), the whole of Port Velhaco is obstructed by rocks, on which the depths are less than 6 feet ($1^{m}8$).

Chart 1809.

Coast.—Light.—Between Ponta Napenja and Ilha Ancuasi, the northernmost of a group of islands which forms the southern entrance point to Porto de Quissimajulo, about 18 miles northward, the coast is backed by ranges of hills, about 2 miles inland; Monte Mesa, described on page 264, is prominent from seaward of this stretch of coast.

Between Ponta Napenja and Ilha Crusse, about 3 miles northward, the coast is fringed with a series of rocks with holes in them, which, from seaward, resemble arches. Ilha Crusse is a small island lying between the entrance points of a bay, which is almost completely filled with a drying sandbank; it is reported that coasting vessels obtain shelter lying aground on this bank near the village of Crusse, situated in the north-western corner of the bay.

Between Ilha Crusse and Ponta Onlugune, about 6½ miles northward, and thence to Ilha Ancuasi (*Lat. 14° 32′ S., Long. 40° 51′ E.*), about 8½ miles farther northward, the coast is steep-to, depths of over 20 fathoms ($36^{m}6$) being found within half a mile offshore, and in the northern part of Enseada de Janga, a large bay situated between 2 and 5 miles northward of Ponta Onlugune, there are depths of over 200 fathoms ($365^{m}8$) within half a mile of the coast.

Charts 653, 1809.

A light, known as Janga light, is exhibited at an elevation of 45 feet ($13^{m}7$), from a white, quadrilateral, framework, concrete tower with a black band, 39 feet ($11^{m}9$) in height, on Ponta Onlugune.

Chart 1809.

Porto de Quissimajulo.—Depths.—Porto de Quissimajulo is used by vessels engaged in the timber trade, but its narrow limits restrict its use to small vessels. The harbour is entered between Ilha Ancuasi and Ponta Cumpadji, about 1½ miles north-north-westward, but both entrance points are fronted by drying coral reefs, between which, there is a narrow channel about one cable wide.

There are depths of from 5 to 15 fathoms ($9^{m}1$ to $27^{m}4$) in the entrance channel, within which, small vessels may obtain anchorage,

Chart 1809.

in depths of 9 fathoms ($16^{m}5$), about 7 cables west-south-westward of Ponta Cumpadji, or in depths of from 39 to 48 feet ($11^{m}9$ to $14^{m}6$), nearly 1½ miles westward of Ponta Cumpadji (*Lat. 14° 31′ S., Long. 40° 50′ E.*).

Leading marks.—Buoy.—Leading marks are erected near Ponta Cumpadji. The front mark is a wooden pyramid, situated on rising ground, about 2 cables west-south-westward of Ponta Cumpadji; the rear mark is a prominent, isolated tree, surmounted by a wooden triangle, which, in 1931, was situated close north-westward of the front mark. These marks in line, bearing 309°, lead from seaward into the entrance channel.

A cask buoy, painted red and surmounted by a triangle, is moored on the southern side of the entrance channel, and marks the northern extreme of the coral reef which fronts the southern entrance point.

Directions.—The following directions were in force in 1931 :—Ihla Ancuasi may be readily identified by a conspicuous group of casuarina trees near its northern extreme. Vessels should keep about 1½ miles from the coast until near the line of the leading marks, when a distinctive patch of sand will be seen near the front mark.

Vessels should approach the entrance with the leading marks in line bearing 309°, and should keep on this line until close to the red buoy, when the latter should be rounded close on the port hand, and a course shaped, in about mid-channel, for either of the anchorages, described above.

Vessels are recommended to enter the harbour at low water, as the dangers on either side are then visible.

Coast.—Light.—Between Ponta Cumpadji and Cabo Culumulomo, about 7 miles northward, the coast is about 300 feet ($91^{m}4$) high, and is fronted by a drying reef of rocks and coral, extending as much as one mile offshore. Cabo Culumulomo is low and rocky, and is fringed with a sandy beach, which extends about 3 miles southward to Ponta Relanzapo, a prominent white, sandy projection, marked by casuarina trees.

A light is exhibited, at an elevation of 27 feet ($8^{m}2$) from a white, square tower surmounted by an open truncated, pyramidal structure on Cabo Culumulomo.

BAÍA DE FERNÃO VELOSO.—Aspect.—Baía de Fernão Veloso is entered between Cabo Culumulomo and Ilha Gomen, an islet about 13 feet ($4^{m}0$) high, situated close to the coast, about 6½ miles north-westward; the ruins of an old fort may be seen on Ilha Gomen. Except in the north-western corner, where some drying rocks lie about 8 cables offshore, the bay is free from dangers within 5 cables of its shores, and vessels of any description may obtain sheltered anchorage in Porto de Nacala, which is entered at the south-western corner of the bay, or in Porto de Belmore, situated at the north-western corner of the bay.

Between Cabo Culumulomo (*Lat. 14° 25′ S., Long. 40° 49′ E.*) and Ponta Naarenque, a low, sandy spit, about 8 miles west-south-westward, which forms the eastern entrance point to Porto de Nacala, the souhtern shore of the bay rises steeply to high land; at Ponta Djiedji, about 3 miles westward of Cabo Culumulomo, there is a conspicuous projecting rock, with a few casuarina trees on either side of it. A

Charts 2762, 597, 748a, 748b, 2483.

Chart 1809.

military station, consisting of a house with a red roof and a flagstaff, stands on the summit of a low hill, about half a mile south-eastward of Ponta Naarenque, and is visible from the entrance to the bay; there are ruins of a fort on Ponta Naarenque.

A conspicuous white house stands about 1¾ miles west-north-westward of Ponta Naarenque.

On the northern side of the bay, between Ilha Gomen and Ponta Utuco, the eastern entrance point to Porto de Belmore, about 5 miles south-westward, there is a moderately flat-topped hill, about 300 feet (91^{m}4) high, which rises steeply from the surrounding level land, and, when seen from about 15 miles northward, resembles a vessel under sail, but, on a closer approach, or when seen on a different bearing, it loses that appearance.

At the head of the bay, between Ponta Sacamulo, the western entrance point to Porto de Nacala, for about 5 miles northward to the western entrance point to Porto de Belmore, the land is moderately high and irregular, and, between 6 and 12 miles north-westward, may be seen Montes Logunus which attain an elevation of about 1,000 feet (304^{m}8), and contain some remarkable saddle-shaped summits, and Monte Dedo a sugar-loaf peak.

Depths.—Anchorage.—The shores of the bay are fringed by drying banks of sand and coral, which extend about half a mile offshore, except south-eastward of the western entrance point to Porto de Belmore, where a drying bank extends about 8 cables offshore; outside these banks, the depths increase very rapidly, and there are depths of over 100 fathoms (182^{m}9) about one mile offshore, in all parts of the bay.

Anchorage may be obtained, in depths of from 6 to 9 fathoms (11^{m}0 to 16^{m}5), on a bank which extends about three-quarters of a mile offshore, from 2 to 4 miles westward of Ponta Djiedji, but caution is necessary in anchoring on this bank, as the depths increase very rapidly off its edge.

Chart 1809, plan of Porto de Nacala.

Porto de Nacala.—Lights.—Porto de Nacala is entered between Ponta Naarenque and Ponta Sacamulo, a sandy spit which projects from low land, about 7 cables south-westward. Between Ponta Naarenque and Ponta Maiaia, about 5 miles southward, the eastern side of the harbour is comparatively steep-to and free from mangrove swamps, and the shore trends southward in a straight line, rising in steep, well-wooded slopes to an elevation of 100 or 150 feet (30^{m}5 or 45^{m}7), broken only by the bold promontory of Ponta Nacuxa, about 3 miles southward of Ponta Naarenque. Onziuani cliff, close southward of Ponta Nacuxa, and Marigariga cliff, close northward of Ponta Maiaia, are both reddish-coloured and are prominent.

A light, known as Fernão Veloso light, is exhibited at an elevation of 18 feet (5^{m}5), from a white, square tower surmounted by an open truncated, pyramidal structure, 16 feet (4^{m}9) in height, on Ponta Naarenque.

A light is exhibited, at an elevation of 18 feet (5^{m}5), from a white, square tower surmounted by an open truncated, pyramidal structure, on Ponta Sacamulo.

A light is exhibited, at an elevation of 18 feet (5^{m}5), from a white, pile structure, 16 feet (4^{m}9) in height, situated close west-north-westward of Ponta Zuani (*Lat. 14° 30′ S., Long. 40° 40′ E.*).

Charts 2762, 597, 748a, 748b, 2483.

Chart 1809, plan of Porto de Nacala.

A light is exhibited, at an elevation of 18 feet ($5^{m}5$), from a white, pile structure, 16 feet ($4^{m}9$) in height, situated close eastward of Pedra das Gaivotas.

A light is occasionally exhibited from the north-western corner of the quay at Ponta Maiaia.

Leading lights for Porto de Nacala are occasionally exhibited from positions on the eastern side of the harbour.

The front light is exhibited, from a white triangle, point up, situated about 1¼ miles south-south-eastward of Ponta Sacamulo.

The rear light is exhibited, from a white triangle, point down, from a position about 3 cables south-south-eastward from the front light.

The western side of the harbour is divided into two bays by a narrow tongue of land, of which the eastern extreme, Ponta Oquera (*Lat. 14° 28′ S., Long. 40° 40′ E.*), about 7 cables south-westward of Ponta Sacamulo, forms the southern entrance point to Baía de Namelala and the northern entrance point to Baía de Muananculo; the heads of both these bays are fronted with drying banks which are covered with mangroves in parts.

Ponta Namuaxi, the southern entrance point to Baía de Muananculo, about 3 miles southward of Ponta Oquera, is also the western entrance point to Baía Bengo which forms the head of the harbour; on the western shore of Baía Bengo, about 2 miles south-westward of Ponta Namuaxi, is the town of Nacala.

Dangers in Porto de Nacala.—Depths.—The eastern side of the harbour is free from dangers outside about 1½ cables offshore, but there are several dangers in Baía de Muananculo and Baía Bengo.

A 3-fathom ($5^{m}5$) bank extends about 4 cables eastward of Ponta Oquera and fronts the northern shore of Baía de Muananculo for about 2 miles south-westward, and the southern shore of the bay is fringed with rocks, northward of which, two spits, with depths of 15 and 16 feet ($4^{m}6$ and $4^{m}9$) extend as much as 6 cables offshore.

Pedra das Gaivotas, an above-water rock, lies near the eastern extreme of a drying bank which extends about 6 cables eastward of Ponta Namuaxi.

Between Ponta Namuaxi and Ponta Miuguri, about 1½ miles south-westward, are several rocks and shoal patches, of which the outermost lies about 6 cables offshore.

A spit, on which the depths are less than 3 fathoms ($5^{m}5$), extends for about three-quarters of a mile offshore, about 1¼ miles southward of Ponta Maiaia.

The depths in mid-channel between the entrance points of Ponta Naarenque and Ponta Sacamulo are about 33 fathoms ($60^{m}3$), decreasing gradually to 13 fathoms ($23^{m}8$) abreast Ponta Namuaxi, and to 3 fathoms ($5^{m}5$) in the southern part of Baía Bengo, about one mile from the head of the harbour. There are depths of 19 fathoms ($34^{m}7$) in the entrance to Baía de Namelala, and depths of from 7 to 11 fathoms ($12^{m}8$ to $20^{m}1$), within the entrance, but large parts of this bay are obstructed by shoals on which the depths are less than 3 fathoms ($5^{m}5$).

Buoys.—Beacons.—A red, conical buoy, surmounted by two cones, points together, is moored about 2½ cables westward of Ponta Maiaia (*Lat. 14° 32′ S., Long. 40° 40′ E.*).

Two red, conical buoys, surmounted by cylindrical topmarks, are moored about 5 cables and 4 cables, respectively, southward of Ponta Maiaia.

Charts 2762, 597, 748a, 748b, 2483.

Chart 1809, plan of Porto de Nacala.

A black, conical buoy, surmounted by two cones, points together, marks the northern end of the spit about 7 cables south-westward of Ponta Maiaia.

A small conical buoy is moored, about 4½ cables eastward of Ponta Miuguri and marks a rock with a depth of less than 6 feet ($1^{m}8$).

A white, triangular beacon, is situated about 4 cables east-south-eastward of Ponta Naarenque and forms a mark for anchoring abreast the military post, but, in 1953, it was reported obscured from seaward by trees.

Tidal streams.—Anchorages.—General remarks.—The tidal streams run strongly in the entrance to Porto de Nacala and also at the anchorage near the military post of Fernão Veloso, but not within Baía Bengo.

Good anchorage may be obtained anywhere within Porto de Nacala, but the anchorage recommended is in Baía Bengo, in depths of from 33 to 39 feet ($10^{m}1$ to $11^{m}9$), east-south-eastward of Ponta Miuguri, about 5 cables offshore ; small vessels may obtain anchorage, in depths of from 18 to 25 feet ($5^{m}5$ to $7^{m}6$), about 2 cables offshore, abreast the town of Nacala. Anchorage may also be obtained in a bight close southward of Ponta Naarenque, abreast the landing place for the military post, in a depth of about 12 fathoms ($21^{m}9$), with the two white beacons in line, bearing about 050°, and with a group of rocks on the beach, close within the point, in line with the broad slope of Monte Dedo, bearing 316°, and also in line with a tree, which, in 1914, was the outermost tree on Ponta Naarenque.

The entrance to the port presents no difficulties. The two leading light-structures in line, bearing 155°, lead in mid-channel through the entrance between Ponta Sacamulo and Ponta Naarenque. The anchorage in Baía Bengo is very sheltered with excellent holding ground.

In 1950, a large quay was under construction at Ponta Maiaia, but in that year, there were no facilities on the quay and ships could not be berthed alongside.

A conspicuous water tank stands about 3 cables south-eastward of Ponta Maiaia.

Pilots.—The pilot boat meets vessels about 3 miles from Fernão Veloso, but if there is a strong northerly wind, vessels are required to proceed to a position about 1½ miles northward of Ponta Sacamulo. Pilots must be ordered in advance from Moçambique.

Chart 1809, plan of Porto de Belmore.

Porto de Belmore.—Beacons.—Porto de Belmore is entered between Ponta Utuco (*Lat. 14° 23′ S., Long. 40° 41′ E.*) and a projection at the north-western corner of Baía de Fernão Veloso, about 1½ miles westward, and affords excellent shelter during the cyclone season. Both entrance points are fronted with drying banks and reefs, which extend as much as 4 cables offshore and contract the width of the navigable channel to less than half a mile. Within the entrance, the eastern side of the harbour is mostly rocky with sandy patches for about 3½ miles, and thence is fronted by a mangrove swamp which extends across the head of the harbour and fringes the western side to close within the western entrance point.

The depths decrease gradually from 26 fathoms ($47^{m}5$) between the entrance points, to 7 fathoms ($12^{m}8$), about 2½ miles within the entrance.

Chart 1809, plan of Porto de Belmore.

There are leading marks at the head of the harbour. The front mark is a pyramid, 20 feet (6^m1) in height, situated near the edge of the mangrove swamp at the head of the harbour. The rear mark is a white, rectangular beacon, 26 feet (7^m9) in height and 10 feet (3^m0) in width, on a small hill about 1¼ miles north-north-westward of the front mark. These marks in line, bearing 333°, lead through the entrance and up the fairway of the harbour.

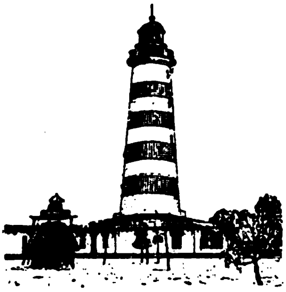
Tidal streams.—Anchorage.—The tidal streams are strong in the entrance to the harbour, and, during the rainy season, the water is much discoloured, and the edges of the reefs are then difficult to distinguish.

Anchorage, in depths of 10 fathoms (18^m3), may be obtained off Nhiendgi, on the eastern side of the harbour, about three-quarters of a mile north-westward of Ponta Utuco, or, in depths of about 7 fathoms (12^m8), off the western side of the harbour, about 2½ miles within the entrance.

Chart 1809.

ILHA GOMEN TO ILHA MEFUNVO.—Coast.—Light.—Danger.—Between Ilha Gomen, described on page 272, and Ponta Cogune, about 7½ miles northward, the coast is covered with a regular line of trees, all, apparently of equal height, and there are several small headlands, with occasional patches of sand and reddish-coloured earth. Between Ponta Cogune and Ponta Nangata, the south-eastern entrance point to Baía de Memba, about 2 miles north-westward, the coast consists of perpendicular cliffs, about 80 feet (24^m4) high, the tops of which appear level.

Monte Dedo, about 10 miles westward, and Monte Roges (Rozhes), about 850 feet (259^m1) high, about 18 miles west-north-westward, respectively, of Ilha Gomen, are the most distinctive landmarks in this neighbourhood; Monte Roges maintains much the same appearance, from whatever direction it is seen.


Pinda lighthouse from northward.
(*Original dated* 1949.)

A light (*Lat. 14° 12′ S., Long. 40° 43′ E.*), known as Pinda light, is exhibited, at an elevation of 214 feet (65^m2), from a conical, stone tower, painted in black and white horizontal bands, over a dwelling 102 feet (31^m1) in height, situated near the village of Pinda, about 6 cables westward of Ponta Cogune. In 1953, a stranded wreck about 5 miles east-south-eastward of Pinda light, formed a prominent mark. This wreck at some distance could be mistaken for a vessel underway.

Baixo do Pinda, a drying coral reef surrounding a lagoon, fronts the coast between Ilha Gomen and Ponta Nangata, and extends as much as 4½ miles offshore; its outer edge is steep-to, and the sea breaks on it in many places. The water in the lagoon is of an emerald green colour, and there is a channel through the reefs into the lagoon, which is used by small native craft.

Current.—In the vicinity of Baixo do Pinda, the southward-going current at times attains a velocity of 5 knots, and, owing to the

Chart 1809.

effect of the tides in the adjacent large bays and of eddies formed off headlands and near the reefs, its direction is subject to wide variations. Vessels should give Baixo do Pinda a wide berth, and Ponta Relanzapo should not be brought to bear less than 180° until well northward of Ponta Cogune.

Baía de Memba.—Anchorage.—Baía de Memba is entered between Ponta Nangata and Ponta Lulo, about 6 miles west-north-westward. Except off the village of Memba in the north-western corner of the bay, the depths in Baía de Memba are generally too great to permit anchorage, but anchorage may be obtained in Porto de Bocage, or in Porto de Duarte Pedroso, both of which harbours are situated at the south-western corner of Baía de Memba, but the limited space in the latter harbour, restricts its use to small vessels.

Baía de Memba is free from dangers, the southern shore, between Ponta Nangata and Ponta Mecontene, about 7 miles westward, being rocky and steep-to, with the exception of a 16-foot ($4^{m}9$) patch, about 3 miles westward of Ponta Nangata. Ponta Mecontene is the northern extreme of a peninsula, which separates Porto de Bocage from Porto de Duarte Pedroso. The northern shore of the bay is moderately high, and is fringed with reefs and rocks which extend about 3 cables offshore from Ponta Lulo for about 2 miles westward, whence the rocks give way to sandbanks, partly covered with mangroves, which extend for about 2½ miles farther westward to the estuary of Rio Mecuburi, at the north-western corner of the bay; the village of Memba stands on the southern bank of the estuary.

The head of the bay is fringed by sandbanks for about 2 miles southward of the village of Memba, whence the shore again becomes rocky for a further 1½ miles to the entrance to Porto de Duarte Pedroso.

The houses in the village of Memba are situated on the north-eastern slopes of a hill which rises to an elevation of about 300 feet ($91^{m}4$), and are a prominent mark to vessels entering the bay. During the rainy season, the large volume of water flowing out of Rio Mecuburi discolours the bay for some distance offshore, but at other seasons, the river nearly dries.

Anchorage may be obtained, about half a mile offshore, eastward of the village of Memba, in depths of from 20 to 30 fathoms ($36^{m}6$ to $54^{m}9$), but great caution is necessary in anchoring as the depths increase very rapidly seaward of this position.

Porto de Bocage.—Dangers.—Anchorage.—Porto de Bocage is entered between a rocky point, situated about 4½ miles west-south-westward of Ponta Nangata (*Lat. 14° 11′ S., Long. 40° 42′ E.*), and a similar point, known as Ponta Sahaja, about 1½ miles westward; the shape of both entrance points is most remarkable, as they resemble the clipper bows of a vessel. Within the entrance, the harbour trends southward for about 3 miles, both sides being fronted with drying, rocky banks, fringed with sunken rocks, which extend as much as 3 cables offshore, while the head of the harbour is a mangrove swamp.

Depths of over 100 fathoms ($182^{m}9$) extend about one mile within the entrance, but the depths then rapidly decrease to 20 fathoms ($36^{m}6$), about 1½ miles within the entrance, whence the harbour shoals gradually to about 5 fathoms ($9^{m}1$), near the edge of the mangrove swamp, about 2¾ miles within the entrance.

A coral reef, which nearly dries, and on which there are several

Charts 2762, 597, 748a, 748b, 2483.

Chart 1809.

above-water rocks, is situated about 2 miles within the entrance, nearly half a mile from the eastern side of the harbour.

Anchorage may be obtained, in depths of about 10 fathoms (18^m3), about 2 miles within the entrance, between the detached coral reef and the edge of the rocky bank fringing the western side of the harbour.

Unless with local knowledge, vessels are advised to enter Porto de Bocage at low water.

Chart 1809, plan of Porto de Duarte Pedroso.

Porto de Duarte Pedroso.—Anchorage.—Porto de Duarte Pedroso lies at the south-western corner of Baía de Memba. The port is entered between Ponta Naueia, about 1¼ miles west-south-westward of Ponta Mecontene, and Ponta Oxelo, about three-quarters of a mile west-south-westward, but both entrance points are fringed with drying banks of coral and stones which contract the entrance channel to a width of about one cable. Within the entrance, the harbour is divided into two narrow inlets by a tongue of land, of which the northern extreme, Ponta Metupa, about one mile south-westward of Ponta Naueia, is also fringed with a drying, rocky reef, which extends about 3 cables north-eastward.

Sheltered anchorage may be obtained by small vessels in either of the inlets, in depths of from 4 to 9 fathoms (7^m3 to 16^m5), mud and good holding ground. The harbour is easy of access as the reefs on either side can generally be seen at low water, and mid-channel is free from dangers; vessels are recommended to await low water before entering.

Chart 1809.

Ponta Lulo to Ponta Serissa.—Aspect.—The appearance of the coast between Ponta Lulo and Ponta Serissa, about 34 miles northward, is very distinctive, as the coast itself is low, but the land close within it, rises to a tableland, about 200 feet (61^m0) high.

Montes Fragosos rise steeply from this tableland, at from 5 to 15 miles inland, their peaks assuming every variety of sugar-loaf, cone and round or square-topped pillars, and in some cases appearing to overhang, and somewhat resembling a mass of ruins. Monte Pilar, 1,680 feet (512^m1) high, a conical mountain with a pyramidal peak, situated about 18 miles south-westward of Ponta Serissa, is the highest and most conspicuous peak of the range, and presents the same appearance from whatever bearing it is seen.

Coast.—Between Ponta Lulo, described on page 277, and Ilheu Tebo (*Lat. 14° 05′ S., Long. 40° 38′ E.*) an islet, 23 feet (7^m0) high, covered with vegetation and lying close offshore, about 3 miles northward, there is a bay the shores of which are fronted by drying, rocky banks; the village of Marengi stands on the northern shore of this bay, about half a mile westward of Ilheu Tebo. Ponta Lulo is low, flat and thickly wooded; its extreme is a stony point which is not conspicuous, but, close northward of Ilheu Tebo, there is a steep projection on the coast, composed of reddish-coloured rock, 108 feet (32^m9) high, which had, in 1914, some detached trees on its summit, which makes a better landmark. From Ilheu Tebo, the coast trends northward for about 5 miles to Ponta Miasi, the southern entrance point to Porto de Simuco, and is moderately steep-to, with no off-lying dangers.

Porto de Simuco.—Anchorage.—Porto de Simuco is entered between Ponta Miasi and Ponta Quissiquitxa, about one mile northward.

Chart 1809.

The entrance channel is narrow and has a sharp turn, but within the entrance, the harbour affords sheltered anchorage for several vessels.

Ponta Miasi is a moderately high bluff, and had, in **1914**, a distinctive isolated clump of baobab trees close to it ; Ponta Quissiquitxa is low, but there is a noticeable detached rock, shaped like the stern of a ship, on the beach, about one cable southward of it.

Both entrance points are fronted by drying, rocky banks, and a spit, on which the depths are less than 21 feet ($6^{m}4$), projects northward from the bank fronting Ponta Miasi, and extends to within 2 cables of the northern shore of the harbour. Within the entrance, the shores are fringed with mangroves and fronted with drying, sandy and rocky banks, and there are some detached drying reefs, but there is a least depth of 45 feet ($13^{m}7$) in the fairway of the entrance channel, and anchorage, in depths of from 33 to 57 feet ($10^{m}1$ to $17^{m}4$), may be obtained in an extensive area in the centre of the harbour.

Directions.—The following directions were in force in **1932** :— Vessels should approach the entrance on the leading line of two marks, situated within the northern entrance point. The front mark is a pyramid, situated on a reddish-coloured patch close to the shore, about three-quarters of a mile west-north-westward of the southern extreme of Ponta Quissiquitxa ; the rear mark is the westernmost tree on the edge of a hill, about 1¼ miles north-westward of the front mark. These two marks are in line, bearing 309°.

Vessels should keep these marks in line, bearing 309°, until the northern extreme of an islet, known as Ilheu Quissindja and situated in the southern part of the harbour, about 1¼ miles westward of Ponta Miasi, is abeam, when course should be altered sharply westward, and the islet brought to bear about one point on the port bow, which will lead to the anchorage, about half a mile northward of the islet.

Vessels are advised to enter Porto de Simuco at low water.

Coast.—From Ponta Quissiquitxa, the coast for about 4½ miles northward, is fringed by a coral reef, which extends as much as one mile offshore, whence a sandy beach extends for about 12 miles northward to Ponta Maria Luiza ; sunken rocks fringe the beach for about 2 miles southward of the latter point, but there are no dangers at half a mile from the coast.

Monte Sofia, a hill, 144 feet ($43^{m}9$) high, lying close within the coast, about 6 miles northward of Ponta Quissiquitxa, has some red patches on its northern side which make it moderately conspicuous, and several villages may be seen on the coast near Ponta Mituasi, which is the name given to five projections, about 5 miles northward of Monte Sofia (*Lat. 13° 53′ S., Long. 40° 35′ E.*).

Chart 1809, plan of Baía Almeida.

Baía Almeida.—Dangers.—Light.—Baía Almeida is entered between Ponta Maria Luiza and Ponta Serissa about 8 miles northward. About one mile north-westward of Ponta Maria Luiza is a mangrove-covered lagoon, in the north-western corner of which is the mouth of Rio Massangage ; on the southern side of the lagoon, there is a prominent bluff, on which, at an elevation of 174 feet ($53^{m}0$), stands the military station of Chaonde. The shores of Baía Almeida are steep-to, and anchorage, sheltered at low water from northerly and north-easterly winds, may be obtained in the northern part of the bay, but it is exposed to southerly winds.

Charts 2762, 597, 748a, 748b, 2483.

Chart 1809, plan of Baia Almedia.

A drying reef of stones and boulders extends about a quarter of a mile offshore for 1½ miles north-westward of Ponta Maria Luiza, and two coral spits project about half a mile offshore in the northern part of the bay.

Restinga Mancabale, a drying reef of sand and coral, fronts Ponta Serissa and projects over 3 miles southward. Baixo Indujo, a detached patch, which dries, lies nearly 1½ miles southward of the southern extreme of Restinga Mancabale.

A patch, on which there is a least depth of 34 feet (10^{m}4), lies about 3¼ miles north-eastward of Ponta Maria Luiza.

Chaonde light is exhibited, at an elevation of 154 feet (46^{m}9), from a white, rectangular structure, 7 feet (2^{m}1) in height, situated about one mile south-south-eastward of the mouth of Rio Massangage.

Anchorage.—Anchorage may be obtained in the southern part of the bay, in depths of about 8 fathoms (14^{m}6), sand, about three-quarters of a mile offshore, with Chaonde light bearing about 206°, or, in the northern part of the bay, in depths of 8 or 9 fathoms (14^{m}6 or 16^{m}5), about one mile from the north-western shore.

Vessels entering Baía Almeida should pass about one mile off Ponta Maria Luiza, and should not attempt to pass northward of Baixo Indujo, as the edges of the reefs cannot be distinguished in all weathers. Vessels should keep Monte Pilar bearing more than 256°, in order to clear the southern extreme of Baixo Indujo (*Lat. 13° 39′ S., Long. 40° 36′ E.*).

Chart 1809.

Baía do Lúrio.—Dangers.—Baía do Lúrio is entered between Ponta Metacáua, the northern extreme of a peninsula which separates Baía do Lúrio and Baía Almeida, about one mile northward of Ponta Serissa, and Ponta Uifundo, about 10 miles northward; during the southern monsoon, sheltered anchorage may be obtained in the southern part of the bay, but it is exposed to northerly winds.

The land within Baía do Lúrio is low, as is also the peninsula separating it from Baía Almeida, but some distance inland, high, craggy peaks may be seen, the intervening country being dense jungle.

Ponta Metacáua is fringed with mangroves, and in 1914, there was, close within the point, a noticeable clump of trees, which, when seen against the higher land in the background, resembled an island. About 5 miles north-westward of Ponta Metacáua is the entrance to Rio Lúrio, the water of which at times discolours the sea for some miles offshore, but the entrance to the river is fronted by a bar which can be crossed only by small craft. On slightly rising ground on the northern bank of the river, are some whitewashed houses, which are prominent from seaward, and there is a military station on either bank about 1½ miles within the entrance.

Chart 1809, plan of Baía Almeida.

Restinga Mancabale, which fronts the end of the peninsula between Ponta Serissa and Ponta Metacáua (*Lat. 13° 33′ S., Long. 40° 36′ E.*), projects about 1½ miles northward of Ponta Metacáua.

A bank, on which the depths are about 5 fathoms (9^{m}1), extends about 1½ miles south-south-eastward of Ponta Uifundo.

Light.—A light is exhibited, at an elevation of 111 feet (33^{m}8), from a red, square, iron framework tower, 69 feet (21^{m}0) in height, on Ponta Uifundo.

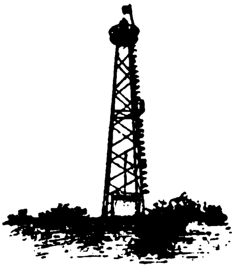
Charts 2762, 597, 748a, 748b, 2483.

Chart 1809, plan of Baia Almeida.

Anchorage.—Anchorage may be obtained, in depths of about 7 fathoms (12^{m}8), south-eastward of the mouth of Rio Lúrio, about 1¼ miles offshore, and about one mile from the western edge of the northern part of Restinga Mancabale.

Vessels from southward should approach Baía do Lúrio, with the military station on the southern bank of Rio Lúrio bearing less than 270°, in order to avoid the northern extreme of Restinga Mancabale.

Coast.—Caution.—Light.—Between Ponta Uifundo and Ponta Maunhane, a moderately bluff point, about 26 miles northward, the coast is moderately high, fringed with a sandy beach and fronted by a coral reef, which has not been closely examined. Vessels should give this stretch of coast a berth of at least 3 miles.



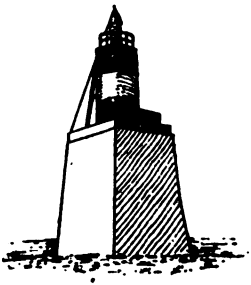
Ponta Uifundo light tower.
(*Original dated* 1949.)

According to the latest determinations, in 1940, the coastline between Ponta Limbuiza, about 3 miles northward of Ponta Uifundo, and Cabo Pequêve (Ras Pekawi) about 90 miles farther northward, lies between one and two miles farther westward than is shown on the charts.

Rio Mécufi (Mkufi) enters the sea about 5 miles northward of Ponta Uifundo, and the village of Mécufi (Mkufi) is situated on high ground on its southern bank. In 1882, vessels of a draught of about 6 feet (1^{m}8) could cross its bar at half tide, and could obtain anchorage in depths of from 2 to 3 fathoms (3^{m}7 to 5^{m}5) close to the southern bank. Fresh provisions and water were then obtainable.

Chart 1816, plan of Porto Amélia.

A light is exhibited, at an elevation of 74 feet (22^{m}6), from a circular, masonry column, painted in black and white bands, on a white, square base, 39 feet (11^{m}9) in height, situated on Ponta Maunhane; the keeper's dwelling, painted white, is situated close to the lighthouse.



Ponta Maunhane lighthouse.
(*Original dated* 1949.)

Porto Amélia and approaches.—Lights.—Porto Amélia is entered between Ponta Romero, situated about 5 miles westward of Ponta Maunhane, and Ponta Saíde Alí, about 1¼ miles northward, and is one of the finest harbours on this coast, affording sheltered anchorage for the largest vessels. When approaching from seaward, a prominent high, conical hill, some distance inland, which, in line with the entrance, bears 232°, forms a useful mark. Ponta Romero (*Lat. 12° 57′ S., Long. 40° 30′ E.*) is low. Ponta Saíde Alí is a moderately high bluff, covered with trees and jungle. Monte Londo, 214 feet (65^{m}2) high, and on which stands a large tree, lies about 3¾ miles northward of the point. On the southern side of the approach, the coast trends west-north-westward for about one mile, then westward for about 1½ miles to Enseada do Imbo, and is fronted by coral reefs extending about 3 cables offshore. From the head of this bay the coast trends west-north-westward for about one mile to Ponta Manhanha and thence to

Chart 1816, plan of Porto Amélia.

Ponta Romero about 1½ miles west-north-westward. A large tree stands about one mile south-westward of Ponta Manhanha.

The town of Porto Amélia is situated on the north-eastern entrance point to the southern arm of the bay, about 1½ miles south-westward of Ponta Romero.

A light is exhibited, at an elevation of 25 feet ($7^{m}6$), from a white, pyramidal, iron structure, 16 feet ($4^{m}9$) in height, situated on Ponta Romero.

A light is exhibited, at an elevation of 48 feet ($14^{m}6$), from a white, pyramidal, iron structure, with a concrete base, 30 feet ($9^{m}1$) in height, situated on Ponta Saíde Alí.

Depths in approach.—Anchorage.—A reef, on which the sea breaks and the water is discoloured, extends about three-quarters of a mile seaward of Ponta Maunhane; between this point and the eastern entrance point of Enseada do Imbo, the shore is fringed by a reef which extends about 4 cables offshore. Imbo bank, with a least depth of 43 feet ($13^{m}1$) over it, extends about 2¾ miles north-north-eastward of Ponta Maunhane. The coastal bank between Enseada do Imbo and Ponta Romero is fringed by a narrow reef. Ponta Saíde Alí is steep-to and the depths in the entrance and in the approach, northward of Imbo bank are generally very great. The entrance is free from dangers.

Good anchorage may be obtained on Imbo bank with Ponte Saíde Alí bearing 272°, distant 5½ miles.

Northern and western parts of Porto Amélia.—Dangers.—Light-buoy.—Between Ponta Saíde Alí and the village of Messequera on the southern side of a creek, about 2 miles northward, the north-eastern shore of the bay is fronted by a coral reef which extends to as much as half a mile offshore, westward of Messequera.

Enseada de Jimpia lies at the head of the bay and is foul. A rocky shoal, with depths of less than 6 feet ($1^{m}8$) over it, and on which there are two above-water rocks, lies about 1¼ miles westward of Messequera; an above-water rock lies about three-quarters of a mile westward of this shoal. The shores of the bay are fronted with foul ground, mud flats and mangroves, with depths of under 6 feet ($1^{m}8$) extending about three-quarters of a mile offshore.

Pantaloon shoal, with a least depth of 30 feet ($9^{m}1$) over it, lies about 2½ miles west-north-westward of Ponta Saíde Alí.

Baixo Mutine, with a depth of less than 6 feet ($1^{m}8$) over it, lies about 3½ miles westward of Ponta Saíde Alí (*Lat. 12° 56′ S., Long. 40° 31′ E.*).

Baixo Pinguim (Penguin shoal) with a least depth of 7 feet ($2^{m}1$) over it, lies about 2 miles westward of Ponta Romero, and is marked by a light-buoy, painted black, and exhibiting a *green flashing* light *every three seconds.* A shoal with a depth of 6 fathoms ($11^{m}0$) over it, lies about three-quarters of a mile westward of this shoal.

Baixos de Mueve, three rocky shoals, the outer of which has depths of less than 6 feet ($1^{m}8$) over it, lie on the shore bank on the western side of the bay, southward of the entrance to Rio Meridi, and extend about 1½ miles offshore.

Southern part of Porto Amélia.—Shoals.—Lights.—Between Ponta Romero and Ponta Mepira, about 1½ miles west-south-westward, a coral reef and discoloured water extend about 2 cables offshore and should be avoided; Ponta Mepira is steep-to, there being depths of

Chart 1816, plan of Porto Amélia.

under 6 fathoms ($11^{m}0$), close inshore all around it. From Ponta Mepira to a landing pier, about half a mile south-eastward, abreast the town of Porto Amélia, depths of under 6 fathoms ($11^{m}0$), extend about 2 cables offshore. Baixo de Nacole, a rocky shoal with depths of less than 6 feet ($1^{m}8$) over it, extends nearly one mile offshore from the village of Chibobar, about 1½ miles south-eastward of the landing stage; it is steep-to on its western side. Between Chibobar and the entrance to Rio Mihezi, about 2½ miles southward, the shore is fronted by reefs and rocks with depths of under 6 feet ($1^{m}8$) over them, extending from about 2½ to 3 cables offshore. The southern and south-western shores of the bay are fronted by mud flats and mangroves, which extend about 2 miles offshore in places. Rio Mehire and Rio Namadaro flow into the south-western part of the bay. Metuburi, a rocky ledge, with a rock with less than 6 feet ($1^{m}8$) over it, close eastward, lies about 3½ miles south-westward of Ponta Mepira (*Lat. 12° 58′ S., Long. 40° 29′ E.*).

Baixos de Paquissanga, which dry and have several above-water rocks on them, lie near the centre of the south-western part of the harbour, about 2 miles west-south-westward of Ponta Mepira.

A light is exhibited, at an elevation of 17 feet ($5^{m}2$), from a red, cylindrical tower, with a concrete base, 19 feet ($5^{m}8$) in height, situated on Ponta Mepira.

A light is exhibited, at an elevation of 11 feet ($3^{m}3$), from a masonry column, 12 feet ($3^{m}7$) in height, situated on the head of the landing pier at Porto Amélia.

Anchorages.—Directions.—Sheltered anchorage may be obtained in the southern part of the bay, in depths of from 10 to 16 fathoms ($18^{m}3$ to $29^{m}3$) southward and south-westward of the town of Porto Amélia. The usual anchorage is in a depth of about 14 fathoms ($25^{m}6$), about 2½ cables southward of Porto Amélia pier (*Lat. 12° 58′ S., Long. 40° 29′ E.*).

Anchorage may also be obtained in the northern part of the bay, in depths of from 9 to 16 fathoms ($16^{m}5$ to $29^{m}3$), taking care to avoid Pantaloon shoal.

Vessels proceeding to the anchorage off Porto Amélia, should pass about half a mile off the coast between Ponta Romero and Ponta Mepira, and should round the latter point at a distance of about 3 cables. Vessels should not approach Baixo Pinguim within a distance of about 1¾ cables from the light-buoy marking that shoal.

Town.—Porto Amélia is a port of growing importance; the town contains a Government house and several public offices.

There is a hospital in the town with a limited number of beds, but it is reported that it is only suitable for very urgent cases.

In 1933, 35 ocean-going vessels, of an aggregate tonnage of 207,870 tons, entered the port, and there is, in addition, a considerable coasting trade.

A harbour tug is available, and there are several dhows available for handling cargo.

There is an airfield about 2¼ miles south-eastward of the town.

Supplies.—Fresh provisions and water are scarce; a limited quantity of vegetables is obtainable at times.

Communications.—There is regular communication by sea with Europe, South Africa and with other East African ports.

Charts 1809, 2762, 597, 748a, 748b, 2483.

Chart 1816, plan of Porto Amélia.

Porto Amélia is connected to the general telegraphic system.

Chart 1809.

Coast.—Between Ponta Saíde Alí described on page 281, and Ponta do Diabo, about 13 miles north-north-eastward, the coast is thickly wooded and for the first 8 miles to the mouth of Rio Tari, is moderately high; it then becomes low and consists of level, black rocks, with occasional deep caves, until it rises again close to Ponta do Diabo. Pedra Mumunuana, a remarkable rock with a tapering base, stands close southward of Ponta do Diabo.

The Stapylton hills, a group of sandhills about 5 miles within the centre of this stretch of coast, are prominent, and a range of hills which surrounds Porto Amélia, also shows up well.

Northward of Ponta do Diabo, the coast again becomes low and thickly wooded, and between the former point and an unnamed point about 5 miles northward, it is divided into two bays.

The southern bay, which is filled with rocks and sand, is entered between Ponta do Diabo and Ponta Monamoera. Rio Fumo connects this bay with Baía do Quipaco (*Lat. 12° 40′ S., Long. 40° 35′ E.*).

The northern bay, Baía do Quipaco, is entered between Sito point, situated nearly 2 miles north-westward of Ponta Monamoera, and the southern extremity of Ilha Quipaco, about one mile north-north-eastward. A drying reef fronts the coast between Ponta do Diabo and the southern extremity of Ilha Quipaco and extends as much as one mile offshore on the western side of Baía do Quipaco. Banks, on which the depths are less than 3 fathoms ($5^{m}5$), encumber the bay and leave only a small anchorage space. A 20-foot ($6^{m}1$) patch lies nearly one mile eastward of Ponta Sito.

Ilha Quipaco lies on the southern edge of the reef fronting the northern entrance point to the bay; there are some bare hills with sand patches on them on the island. Pedra Camelo (Camel rock), a detached rock close northward of Ilha Quipaco, is so called from its resemblance to a camel.

Vessels wishing to enter Baía do Quipaco are advised to do so at low water, passing close to the southern side of Ilha Quipaco and anchoring almost immediately after passing that island.

Porto da Arimba.—Anchorage.—Porto da Arimba is entered between Ponta Nangamba and the southern extreme of Ilha Quisiva, about 1¾ miles northward. The western side of the harbour, between Ponta Nangamba and an unnamed point, about 7 miles north-north-westward, is low, covered with palm trees, and fronted by a bank, which partly dries, on which the depths are less than 3 fathoms ($5^{m}5$), which extends as much as 1½ miles offshore; the village of Arimba is situated in the south-western corner of the harbour, about 3½ miles westward of Ponta Nangamba. The eastern side of the harbour is formed by an extensive drying reef, in the centre of which is Ilha Quisiva (*Lat. 12° 36′ S., Long. 40° 37′ E.*). The northern side of the harbour is formed by a reef with Ilha Mefunvo at its eastern end. There is a narrow channel between Ilha Mefunvo and Ilha Quisiva with a depth of 3 fathoms ($5^{m}5$).

Ilha Quisiva is low, undulating and covered with scrub; in 1914, there were two noticeable trees on its southern extreme, and some ruins are visible on its eastern part. Ilha Mefunvo, the highest of all

Charts 2762, 597, 748a, 748b, 2483.

Chart 1809.

the islands in this vicinity is covered with thick green scrub, and there are two villages on the island.

Porto da Arimba is entered by a narrow channel, with depths of 2 fathoms ($3^{m}7$), between banks which extend northward from Ponta Nangamba and southward from Ilha Quisiva. Small craft may obtain anchorage in depths of about 3 fathoms ($5^{m}5$), in a narrow area between the western edge of the reef surrounding Ilha Quisiva and Ilha Mefunvo and the eastern edge of the bank which fringes the western shore. There is a very narrow passage between the reefs surrounding Ilha Quisiva and Ilha Mefunvo with a least depth of 18 feet ($5^{m}5$).

Vessels are advised to enter Porto da Arimba (*Lat. 12° 35′ S., Long. 40° 35′ E.*) at low water.

Charts 1809 and 658.

ILHA MEFUNVO TO CABO DELGADO.—General remarks.—Ilhas Quirimba are a chain of islands and reefs which form an archipelago which fronts the coast for about 110 miles from Porto da Arimba to about 4 miles southward of Cabo Delgado. In the southern part of the archipelago, from Ilha Quisiva to Ilha Macalóe about 36 miles northward, the islands and reefs do not extend beyond 8 miles from the coast, but, northward of the latter island, the outermost reefs and islands are generally found from 10 to 13 miles from the coast of the mainland.

The islands are generally low, well wooded and often undulating, and are easily seen from seaward ; a large number are mere coral islets, and the numerous passages between the outer islands and reefs, lead to even more numerous inlets and channels where small craft may obtain sheltered anchorage. No fresh water can be obtained from any of the islands northward of Cabo Pequêve, about 45 miles northward of Ilha Quisiva, and from this cause, these islands remain uninhabited. The coast of the mainland abreast the islands is generally low, and can rarely be distinguished when passing outside the outer reefs, and, as the seaward edges of the latter are steep-to, caution is necessary, even by day, when navigating in this vicinity.

Vessels on passage along this coast, will gain nothing by using the passages between the islands northward of Cabo Pequêve (*Lat. 11° 51′ S., Long. 40° 31′ E.*), but, should this be necessary, the most favourable time to make the passages, is at low water, with the sun astern of the vessel, and constant sounding is necessary.

Tidal streams.—Current.—Within the outer islands the tidal streams are weak, and are greatly influenced by the winds ; the westward-going tidal stream, or that of the rising tide, is usually the stronger, and enters the archipelago by the various openings between the reefs.

The normal southward-going current will be experienced about 10 miles outside the outer reefs, until about 20 miles southward of Cabo Delgado. *See* notes on currents, page 18.

Chart 1809.

Coast.—Islands and dangers.—Light.—Signal station.—Baía de Montepuês is entered between the northern extremity of Ilha Mefunvo and the reefs and islets extending southward from the southern end of Ilha Quirimba, about 2 miles northward. Rio Montepuês flows into the head of the bay, and there is a village of the same name at its mouth, but they are both unimportant. Access

Charts 2762, 597, 748a, 748b, 2483.

Chart 1809.

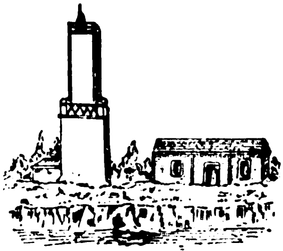
to the bay is much restricted by the reefs extending northward from Ilha Mefunvo and southward from Ilha Quirimba. Small coasting craft may enter the bay from southward through a narrow channel between these reefs and from northward through a similar channel, which dries, leading from the southern end of Porto do Ibo.

Ilha Quilaluia, small and wooded, lies about 2 miles northward of the northern end of Ilha Mefunvo ; close southward of Ilha Quilaluia is a narrow channel through the reef which leads into Baía de Montepuês, but between Ilha Quilaluia and Ilha Mujaca, an island off the north-eastern extreme of Ilha do Ibo, about 10 miles northward, the reef is unbroken by channels, and has depths of from 8 to 20 fathoms ($14^{m}6$ to $36^{m}6$) along its outer edge.

Temporary anchorage may be obtained, in depths of 13 fathoms ($23^{m}8$), coral, about 8 cables south-eastward of the southern extreme of Ilha Quilaluia, and about 3 cables from the edge of the reef.

Ilha Sencar lies near the edge of the reef, about 2 miles north-eastward of Ilha Quilaluia ; it has some low hills on which are a few trees.

Ilha Quirimba the most fertile island in the archipelago, lies about 2 miles northward of Ilha Quilaluia ; it is low, wooded and fringed with a sandy beach, and there are ruins of a village on it, although there is now only a nomadic population. The water from its wells is good. The reef extends over one mile eastward of the eastern coast of Ilha Quirimba, and, on its outer edge about 1½ miles north-eastward of the southern extreme of that island, lies Macula, a group of above-water rocks.



Ibo lighthouse.
(*Original dated* 1949.)

Ilha do Ibo, an island which forms the southern side of Porto do Ibo, lies about 3 miles northward of the northern extremity of Ilha Quirimba, to which it is connected by mangrove swamps.

A light, known as Ibo, is exhibited at an elevation of 54 feet ($16^{m}5$), from a white, concrete tower, on a white, masonry base, 49 feet ($14^{m}9$) in height, situated on Ilha Mujaca. The light-keeper's dwelling, painted yellow, is situated close to the lighthouse.

There is a signal station at the lighthouse, which is connected by telephone to the town of Ibo (*Lat. 12° 20′ S., Long. 40° 35′ E.*).

Outlying dangers.—St. Lazarus bank, which lies about 45 miles east-north-eastward of Ilha Mujaca lighthouse, has general depths of from 8 to 15 fathoms ($14^{m}6$ to $27^{m}4$), but at its northern end is a shoal area, with a least depth of 21 feet ($6^{m}4$).

A depth of 9 fathoms ($16^{m}5$), which has not been examined, was reported, in 1943, about 27 miles south-south-eastward of the southern extremity of St. Lazarus bank, as defined by the 100-fathom ($182^{m}9$) line.

Chart 1816, plan of Porto do Ibo.

Porto do Ibo.—Aspect.—Porto do Ibo is entered between Ilha Mujaca and the southern extreme of Ilha Matemo, about 5 miles northward. The western side of the harbour is formed by the main-land between Ponta Quissanga and Ponta Quirimisi, about 12 miles

Charts 2762, 597, 748a, 748b, 2483.

Chart 1816, plan of Porto do Ibo.

northward, but large parts of the harbour are encumbered with banks and shoals which restrict the space available for anchorage. Fair anchorage, although exposed to easterly winds, may be obtained, in depths of about 8 to 13 fathoms (14^{m}6 to 23^{m}8) about 4 miles north-westward of Ilha Mujaca.

Ilha do Ibo is low and flat, but the lighthouse on Ilha Mujaca shows up well against the dark-green vegetation, and the coconut palms in the town of Ibo, about 2 miles westward of Ilha Mujaca, are distinctive, as is also the white fort of São João at the north-western end of the town, which presents a long front when seen from north-eastward.

There is a conspicuous casuarina tree near the south-eastern extreme of the island, about 1½ miles southward of Ilha Mujaca.

Ilha Quirambo lies on the shore bank, about 1¾ miles westward of the southern extreme of Ilha do Ibo, and is surrounded by mangroves. Ilha Fion lies on a bank, which dries, about 2 miles westward of Ilha Quirambo.

Ilha Matemo is low and covered with straggling trees ; it has some very distinctive red-and-white patches, and there is a beach of white sand on its south-eastern side. There is a conspicuous casuarina tree near the southern extreme of the island. Ponta Ucáia, the north-western point of the island, lies about 4 miles north-north-westward of the southern extreme of the island and is wooded. There are several villages on the island. Ilha Manuel da Silva is a small islet close off its south-eastern side.

The land within the coast between Ponta Quissanga and Ponta Quirimisi is moderately high and is backed by a range of hills which are visible at a distance of about 20 miles ; the southern end of the range terminates in a bluff, with a conical hill close southward of it.

Dangers in Porto do Ibo and approach.—Depths.—Beacon.—Mujaca shoal is a drying, rocky reef, which fronts the northern side of Ilha do Ibo, and extends about one mile offshore in places.

Baixo de São Gonçalo is a rocky shoal which dries, and lies nearly in mid-channel between Ilha do Ibo and Ilha Matemo, and separates Canal do Norte from Canal do Sul. A beacon stands near the western end of the shoal, the north-eastern and eastern sides of which are fronted by foul ground and a bank, with depths of less than 3 fathoms (5^{m}5) over it, which extends from 2½ to 5 cables from the edge of the shoal ; when covered, this shoal is marked by breakers or by the discoloration of the water over it. A rock, with a depth of less than 6 feet (1^{m}8) over it, and a shoal, with a least depth of 14 feet (4^{m}3) over it, lie, respectively, about 1¼ miles north-westward and 2¼ miles westward of the beacon on Baixo de São Gonçalo (*Lat. 12° 17′ S., Long. 40° 35′ E.*).

Ilha Matemo is surrounded by a drying, rocky reef which extends from about half a mile to one mile offshore on its eastern and southern sides ; on the western side of the island the reef and foul ground extend about one mile offshore in places ; a rock, with less than 6 feet (1^{m}8) over it, lies off the edge of the foul ground, about one mile west-north-westward of the south-western extreme of the island ; on the northern side of the island the reef extends about a mile offshore ; a detached shoal, with a least depth of 9 feet (2^{m}7) over it, lies about 2 miles northward of Ponta Ucáia ; patches of discoloured water

Charts 1809, 2762, 597, 748a, 748b, 2483.

have been reported to extend from abreast Ilha Manuel da Silva for about 3 miles eastward.

In the south-eastern part of the harbour, between the western extremity of Mujaca shoal and Ilha Fion, about 4 miles south-westward, the shore bank with depths of less than 3 fathoms ($5^{m}5$) extends over 2 miles offshore, in places.

Between Ponta Quirimisi and the western entrance point of Canal da Tandanhangue, about 8¾ miles southward, the western shore of the harbour is fronted by an extensive bank, with depths of less than 3 fathoms ($5^{m}5$) over it, and on which there are reefs which dry. Envie shoal, the northern part of this bank, extends nearly 4½ miles offshore, about 4½ miles south-eastward of Ponta Quirimisi. Baixo Mevú, a rocky reef, which dries, extends about 2¼ miles offshore, in places, about 4 miles southward of Ponta Quirimisi. Rio Quiriamacoma flows into the harbour southward of this reef. Baixo Muſtune, a reef which dries, lies about 2½ miles south-eastward of the southern extreme of Baixo Mevú; its eastern side is steep-to. Baixo Maquinze, which dries, lies about one mile southward of Baixo Muſtune. A shoal, with a least depth of 16 feet ($4^{m}9$) over it, lies in the fairway of Canal de Tandanhangue, about three-quarters of a mile north-westward of Ilha Fion (*Lat. 12° 22′ S., Long. 40° 32′ E.*).

From Ponta Quirimisi to Praia do Goludo, about 3¾ miles north-north-westward, a bank, with some reefs on it and with depths of less than 3 fathoms ($5^{m}5$) over it, extends from one to 1½ miles offshore.

Channels. — Buoyage. — Canal do Sul, which is the channel generally used, leads into the harbour between Baixo de São Gonçalo and Mujaca shoal. The channel is marked by a light-buoy and three spar buoys.

No. 2 light-buoy, painted red, and exhibiting a *red flashing* light *every four seconds*, marks the southern side of the entrance to Canal do Sul, and is moored nearly 2 miles north-north-westward of Ibo lighthouse; No. 1 spar buoy, painted black, and surmounted by a cone, point up, marks the northern side of the channel entrance, and is moored nearly 2½ miles north-north-westward of the same lighthouse. The edge of the shoal ground on the southern side of the channel is marked by Nos. 4 and 6 spar buoys, each painted red, and surmounted by a cage topmark, situated about 2¼ miles north-north-westward and north-westward, respectively, of Fort São João.

Canal do Norte, leads into the harbour between the reef extending southward from Ilha Matemo and Baixo de São Gonçalo and is not buoyed.

Tidal streams.—Anchorage.—The tidal streams run strongly both at the anchorage and in the channel between Mujaca shoal and Baixo de São Gonçalo; in the latter channel, the in-going tidal stream sets towards Baixo de São Gonçalo and the out-going tidal stream sets towards Mujaca shoal.

Anchorage may be obtained in depths from 38 to 47 feet ($11^{m}6$ to $14^{m}3$), with São João fort bearing 126°. The holding ground in the anchorage at the western end of Canal do Sul, about 4 miles north-westward of Ilha Mujaca is indifferent and tidal streams run strongly at this anchorage. Anchorage may also be obtained off the north-western side of Ilha Matemo, in depths of from 30 to 36 feet ($9^{m}1$ to

Chart 1816, plan of Porto do Ibo.

11m0), about half a mile south-westward of Ponta Ucáia (*Lat. 12° 12′ S., Long. 40° 34′ E.*).

Directions.—When approaching the channel between Mujaca shoal and Baixo São Gonçalo which is that normally used, care should be taken to avoid the discoloured water which may be seen south-eastward of Ilha Matemo.

No difficulty should be experienced in entering Porto do Ibo if the buoys are in position, but if not, vessels are advised to enter the harbour at or near low water, as the drying edges of Mujaca shoal and Baixo de São Gonçalo are both clearly defined from two hours before, to two hours after, low water.

Inner harbour.—Danger.—Beacon.—Canal do Ibo is situated off the north-western side of Ilha do Ibo; its head is shoal and is fronted by mud flats and mangroves; the town of Ibo is situated on the south-eastern side near the head of the channel. The channel is approached across a bar, which, in 1940, had depths of from one to 4 feet (0m3 to 1m2) over it; a rock, with less than 6 feet (1m8) over it, lies on the bar, about 1½ miles north-north-westward of São João fort. A beacon stands on the drying bank, on the western side of the channel, about one mile north-westward of the fort.

Town.—The town of Ibo is built partly of stone and had, in 1940, a population of 3,640, of whom only 32 were Europeans.

The climate is reported to be unhealthy from the middle of January to the middle of March, and during this period, fevers are often fatal. There is a hospital.

Small quantities of fresh provisions may be obtained, but water is scarce.

Large numbers of turtles may be found on the beach on Ilha Matemo in certain seasons, and a plentiful supply of fish can be obtained.

Communications.—There is regular communication by sea with Europe and South Africa, and with other East African ports.

Ilha das Rolas.—Anchorage.—Directions.—Ilha das Rolas, an uninhabited island, about 2½ miles northward of Ilha Matemo is low, covered with brushwood, and surrounded by reefs, which extend about three-quarters of a mile eastward; its north-western extreme is sandy and affords the best landing. The casuarina trees on the south-western part of this island are conspicuous.

Sheltered anchorage may be obtained in depths of from 29 to 45 feet (8m8 to 13m7), between three-quarters of a mile and 1¾ miles south-south-westward of the south-western extreme of Ilha das Rolas.

Vessels should approach Ilha das Rolas with its southern extreme bearing 272°; a distant peak, bearing 240°, leads between the reefs extending from Ilha Matemo and from Ilha das Rolas, and when about one mile from the latter island, course should be altered on to this line, taking care to avoid the detached shoal about 2 miles northward of Ponta Ucáia mentioned on page 287.

Chart 1809.

Coast.—Islands and dangers.—Between Ponta Quirimisi (*Lat. 12° 12′ S., Long. 40° 31′ E.*) and Ponta Pangane, about 12 miles northward, the coast is low and divided into two bays by Ponta Pabula, a projection, about 7 miles northward of Ponta Quirimisi; both Ponta Pabula and Ponta Pangane are fronted by reefs which

Charts 2762, 597, 748a, 748b, 2483.

Chart 1809.

extend about 2 and 1½ miles, respectively, eastward of the points. There is a small settlement on Ponta Pangane (*Lat. 12° 00′ S., Long. 40° 33′ E.*).

Zala, a reef which dries, lies at the south-western end of a rocky bank, with depths of 3 fathoms (5^m5), or less, over it, about 4 miles east-south-eastward of Ponta Pabula.

Ilha Mogundulo, fringed by a reef which dries, lies on the edge of the coastal bank about 3 miles north-eastward of Ponta Pabula.

About 1½ miles northward of Mogundulo is Ilha Quifula, on the reef extending from Ponta Pangane.

Ilha Macaloé, the southern extremity of which lies about 3½ miles eastward of Ponta Pangane, is surrounded, except on its western side, by an extensive drying reef; there is a narrow channel, with a depth of about 3 fathoms (5^m5) in it, between Ilha Macaloé and Ilha Quifula. Small craft may obtain sheltered anchorage, in depths of about 2 fathoms (3^m7), close westward of Ilha Macaloé.

A rocky shoal, with a depth of 31 feet (9^m4) over it, lies about 3 miles east-south-eastward of the southern extremity of Ilha Macaloé.

Between Ponta Pangane and Cabo Pequêve, about 9 miles northward, the coast forms a large bay which affords shelter in southerly winds. The shore of the bay is low, sandy and covered with mangroves, and is fronted by a sandy bank, the inner part of which dries.

Bangue, a reef which dries, lies on the coastal bank about 2 miles north-north-westward of Ponta Pangane.

Pangane, a reef which dries, lies about 4½ miles north-north-westward of Ponta Pangane and 2 miles offshore.

Pantalon, a 2-fathom (3^m7) coral patch, lies about 4½ miles northward of Ilha Macaloé; there is good anchorage on its northern side.

Techantia, a reef which dries, lies about 3 miles northward of Ilha Macaloé; depths of 16 feet (4^m9) extend about 5 cables from its western end.

Ingoane, with depths of less than 6 feet (1^m8) over it, lies about 2½ miles south-south-eastward of Cabo Pequêve (*Lat. 11° 51′ S., Long. 40° 31′ E.*).

Caution.—*See* page 281.

Chart 658.

Cabo Pequêve to Cabo Iamcumbi.—Mdjumbi pass.—Light.—Cabo Pequêve is low and sandy, and, in 1874, had a clump of casuarina trees, 70 feet (21^m3) high, on its extreme; a drying, rocky reef extends for about 2 miles eastward, and a bushy islet, 17 feet (5^m2) high, stands on the reef, about half a mile eastward of the point.

Between Cabo Pequéve and Ras Nenumba, about 7 miles north-north-westward, a sandy beach extends for the first 4 miles and then gives way to mangroves, intersected by creeks, and the coast is fronted by a bank, which dries in places and on which the depths are less than 3 fathoms (5^m5), which extends as much as 2 miles offshore. A wooded range of hills, from 200 to 300 feet (61^m0 to 91^m4) high, runs parallel with the coast, from 2 to 3 miles inland, and numerous villages may be seen within the sandy beach.

Between Ras Nenumba and Cabo Iamcumbi (Ras Yamkumbi) (*Lat. 11° 37′ S., Long. 40° 28′ E.*), about 7½ miles northward, the coast is low, swampy and fringed with mangroves intersected by creeks. Mto Marari enters the sea through a wide estuary, about

Charts 2762, 597, 748a, 748b, 2483.

Chart 658.

one mile southward of Cabo Iamcumbi, but the estuary, is almost completely filled with drying mudbanks and rocks, which leave only a narrow channel available for small craft of a draught of 2 feet (0^m6). The most prominent feature on this stretch of coast, is a gap caused by a sudden break in the range of hills inland.

The coast between Cabo Pequéve and Cabo Iamcumbi is approached from seaward by Mdjumbi pass, a break or pass in the reefs between Ilha Mdjumbi, situated about 6 miles east-north-eastward of Cabo Pequéve and Mwamba Wadiazi, a reef about 6 miles northward; it is clear of dangers for a width of about 4 miles between Ilha Mdjumbi and Mwamba Wadiazi, and there are depths of over 400 fathoms (731^m5) in the centre of the pass. The mainland is indistinct when approaching the pass from seaward, but the high trees on Ilha Mdjumbi may be clearly seen, and the sides of the pass are marked by the heavy surf on the edges of the reefs, *see* view B on chart 658.

Ilha Mdjumbi is low and thickly wooded, and has on its southern side, two tall trees. It is surrounded by a reef which extends as much as 3 miles north-eastward, on which there are drying sandy patches.

A light is exhibited, at an elevation of 98 feet (29^m9), from a white, square, framework tower, 78 feet (23^m8) in height, situated on the eastern extreme of Ilha Mdjumbi.

Mwamba Wadiazi, the reef which forms the northern side of Mdjumbi pass, is about 5 miles in extent and is composed of coral and sandbanks, which dry from 2 to 7 feet (0^m6 to 2^m1). The reef is steep-to except on its western side, where a bank, on which the depths are less than 2 fathoms (3^m7), connects it to Cabo Iamcumbi, and its south western part is broken up into innumerable rocks and coral patches, with intervening depths of 2 and 2½ fathoms (3^m7 and 4^m6).

Islets and dangers within Mdjumbi pass.—Quissanga (Kisanga) islet, a sandy islet, covered with brushwood, lies about 2½ miles westward of Ilha Mdjumbi, on the western side of a reef which is separated from that on which Ilha Mdjumbi stands, by a narrow channel. There is a clear channel, over one mile in width, between Quissanga islet and the reefs extending eastward of Cabo Pequêve, this channel is used by coasting craft.

Gray rock, a pinnacle rock, with a depth of 1½ feet (0^m5) over it, lies about 2½ miles north-north-westward of Ilha Mdjumbi.

Mwamba Mcholi, a drying, coral reef, about three-quarters of a mile in extent, is situated about 3 miles north-eastward of Ras Nenumba.

Kero Niuni (Nyuni), an islet 20 feet (6^m1) high, covered with bushes, lies on the north-western extreme of Mwamba Wadiazi, about 6 miles eastward of Cabo Iamcumbi (*Lat. 11° 37′ S., Long. 40° 28′ E.*).

Anchorages.—Good anchorage may be obtained westward of Quissanga islet, in depths of about 8 fathoms (14^m6), sand and shells, about 5 cables off the edge of the reef, with the tall trees on Ilha Mdjumbi in line with Quissanga islet, bearing about 079°. This anchorage may be safely approached either by the channel between Cabo Pequêve and Quissanga islet, or by Mdjumbi pass, but in the latter case, care must be taken to avoid Gray rock.

Anchorage may also be obtained, in depths of from 5 to 15 fathoms (9^m1 to 27^m4), sand and coral, anywhere in the area within Mdjumbi pass, which is clear of the dangers described above.

Charts 2762, 597, 748b, 2483.

Chart 658.

Cabo Iamcumbi to Raz Ulu.—Passagem de Kero Niuni and Nameguo pass.—Between Cabo Iamcumbi (*Lat. 11° 37′ S., Long. 40° 28′ E.*) and Raz Ulu about 13 miles northward, the coast is low, wooded and fringed with mangroves, and is seldom visible from seaward of the reefs. A coral reef fronts the coast and extends between 7 cables and 2½ miles offshore ; the inner part of the reef dries, exposing mudbanks at the entrances to the numerous creeks.

For about 2 miles southward of Raz Ulu, the coast is covered with mangroves, but the land close within is somewhat elevated, and water may be obtained from some wells a short distance within Raz Ulu ; Mpandaji, the only village in this vicinity, lies at the mouth of Mto Luseti, about 5 miles northward of Cabo Iamcumbi, and about 1½ miles southward of the slight projection of Ras Mpandaji.

This part of the coast may be approached either by Passagem de Kero Niuni or Nameguo pass, while vessels from northward may also approach by Passagem de Tambúzi, which is described on page 293.

Passagem de Kero Niuni lies between Mwamba Wadiazi, described above and Mwamba Wanuni, a reef which dries 9 feet ($2^{m}7$), situated about 4 miles northward, and about 6½ miles eastward of Ras Mpandaji ; the outer part of the pass is clear of dangers, and has depths of over 200 fathoms ($365^{m}8$).

Nameguo pass lies between Mwamba Wanuni and Fungu Nameguo, an extensive coral reef, with several drying sandbanks on it, situated about 1¾ miles north-eastward and about 10 miles east-south-eastward of Raz Ulu. The northernmost sandbank on Fungu Nameguo dries, but is covered at high water springs, when the sea breaks heavily on it. The seaward edge of this reef is steep-to, and a cross-sea is generally experienced off it when there is any wind.

Dangers within Passagem de Kero Niuni.—Anchorages.—Mwamba Kizingiti, a drying, coral patch, lies near the centre of the inner end of Passagem de Kero Niuni, about 3 miles northward of Kero Niuni islet ; its position, even when covered, is generally indicated by breakers, and there are channels both northward and southward of the patch.

Seli-Seli rocks, several flat-topped, coral rocks, about 10 feet ($3^{m}0$) high, lie near the edge of the reef which extends about 2½ miles eastward of Cabo Iamcumbi.

The depths in Passagem de Kero Niuni decrease rapidly from over 100 fathoms ($182^{m}9$) to less than 25 fathoms ($45^{m}7$), when about one mile eastward of Mwamba Kizingiti, but, from this position, Seli-Seli rocks and Kero Niuni islet are both plainly visible.

During the southern monsoon, good anchorage may be obtained, in depths of 6 fathoms ($11^{m}0$), sand and coral, about one mile north-westward of Kero Niuni islet, and, for a small vessel, during the north-east monsoon, half a mile south-westward of the same islet ; anchorage may also be obtained close southward of Mwamba Wanuni.

Dangers within Nameguo pass.—Anchorages.—Mwamba Majiwe Kubwa, a coral reef on which is a sandbank, which dries 11 feet ($3^{m}4$), lies about 4½ miles eastward of Ras Mpandaji.

Fungu Lamkunama is a drying, coral reef, with a sandbank at its western end, situated about 5 miles east-north-eastward of Ras Mpandaji ; a 2-fathom ($3^{m}7$) detached patch, lies about 5 cables westward of the sandbank on this reef.

Charts 2762, 597, 748b, 2483.

Chart 658.

Baixo Chapman is a drying, coral reef, situated about 4½ miles south-eastward of Raz Ulu; it is steep-to.

Crawford reefs are several drying patches of coral, situated on the outer edge of the reef which fronts the coast northward of Ras Mpandaji.

Ilha Mionge (*Lat. 11° 25′ S., Long. 40° 32′ E.*), a thickly-wooded islet, about 66 feet ($20^{\text{m}}1$) high, lies near the eastern edge of a reef which extends over 5 miles eastward of Raz Ulu. About one mile south-eastward of Ilha Mionge the reef is fringed with mangroves, and there are some detached shoals close off its southern edge.

Good anchorage, in depths of from 5 to 12 fathoms ($9^{\text{m}}1$ to $21^{\text{m}}9$), sand and coral, may be obtained within Nameguo pass, the best berths depending on the monsoon, the prevailing strong winds being north-easterly and south-easterly. A good berth is in depths of from 7 to 9 fathoms ($12^{\text{m}}8$ to $16^{\text{m}}5$), off the western side of Fungu Nameguo, and anchorage, in similar depths, may also be obtained eastward of the south-eastern extreme of Mwamba Majiwe Kubwa (*Lat. 11° 31′ S., Long. 40° 32′ E.*).

PORTO DE MOCÍMBOA DA PRAIA AND APPROACHES. —Passes.—Porto de Mocímboa da Praia, situated between Raz Ulu and Cabo Msange (Ras Msangi), about 13 miles northward is a capacious and sheltered harbour, in which vessels may obtain anchorage, in depths of from 3½ to 10 fathoms ($6^{\text{m}}4$ to $18^{\text{m}}3$); the dangers in the principal approach channel are marked by buoys.

Between Raz Ulu and Ponta Levura, about 6 miles west-north-westward, the southern side of the harbour is fringed with mangroves, within which, the land rises in wooded slopes to an elevation of about 200 feet ($61^{\text{m}}0$). Ponta Levura is low and flat, and is the southern entrance point to Mto Mocímboa, a creek which lies at the head of the harbour. Ponta Vermelha (Ras Niguro), the northern entrance point to Mto Mocímboa, about 1½ miles northward of Ponta Levura, is a bold bluff and the highest point in the vicinity and resembles the point of that name in Baía de Lourenço Marques. It forms the southern end of a range of thickly wooded hills, which extends northward for about 40 miles, between one and 8 miles inland. For about 2 miles north-eastward of Ponta Vermelha the north-western side of the harbour is formed by cliffs, about 83 feet ($25^{\text{m}}3$) high, whence, for a further 9 miles north-eastward to Cabo Msange the shore is low, sandy and fringed with mangroves in places.

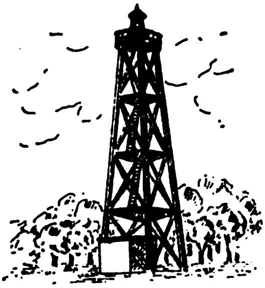
Cabo Msange is a well-defined projection, 47 feet ($14^{\text{m}}3$) high; it may be identified by a clump of casuarina trees, 94 feet ($28^{\text{m}}7$) high, which, in 1874, stood on its northern side and formed the most prominent feature in the vicinity.

In the approaches to Porto de Mocímboa da Praia, the principal pass through the outer reefs is Passagem de Tambúzi, but Nameguo pass, described on page 292, may also be used by vessels from southward and Passagem de Suna and Passagem de Niuni are also available to vessels from northward. Within the outer reefs, the harbour is entered through Passagem de Mionge, a channel through an inner chain of islets and reefs, which fronts the harbour between Raz Ulu and Cabo Msange.

Passagem de Tambúzi.—Light.—Danger.—Passagem de Tambúzi is a channel about 3 miles in width, which is entered between

Charts 2762, 597, 748b, 2483,

Fungu Nameguo and Ilha Tambúzi, an island about 9 miles east-north-eastward of Raz Ulu. Ilha Tambúzi is higher than the adjacent islands, and in 1874, there were groups of tall casuarina trees near its extremes; except on its western side, it is surrounded by a reef, which extends over 2 miles offshore in places, and on the eastern side of which, is a sandbank, which dries 4 feet (1^{m}2). *See* view A on chart 658.



Tambúzi light-tower.
(*Original dated* 1949.)

A light (*Lat. 11° 22′ S., Long. 40° 39′ E.*) is exhibited, at an elevation 85 feet (25^{m}9), from a white, framework, concrete tower, 60 feet (18^{m}3) in height, on the eastern extreme of Ilha Tambúzi.

There are depths of over 100 fathoms (182^{m}9) at the entrance to the pass, but the depths decrease very rapidly, and close within the entrance the pass is divided into two channels by Baixo Bower, a group of coral patches, with a least depth of 2¾ fathoms (5^{m}0). There are depths of from 5½ to 27 fathoms (10^{m}1 to 49^{m}4) in the channel southward of Baixo Bower, and of 5½ to 9 fathoms (10^{m}1 to 16^{m}5) in the channel northward of that shoal.

Passagem de Suna.—This pass is entered between Ilha Tambúzi and Mwamba Tambula, about 4 miles northward. Mwamba Tambula is a coral reef, on which there are sandbanks and boulders which dry from 5 to 9 feet (1^{m}5 to 2^{m}7); it is steep-to on its northern and eastern sides, which are clearly defined by breakers. Niuni (Nyuni) islet, 17 feet (5^{m}2) high, lying at the north-western extreme of Mwamba Tambula, is flat and covered with grass, but at a distance, resembles a bare sandbank.

Ilha Suna, a coral island, about 58 feet (17^{m}7) high, its summit crowned with trees, stands at the head of the pass, about 5 miles north-westward of Ilha Tambúzi lighthouse, on a reef which extends about one mile southward and eastward.

The depths at the entrance to the pass are over 100 fathoms (182^{m}9), but they decrease very rapidly to less than 20 fathoms (36^{m}6), close within the entrance, whence they decrease gradually until close to the inner reefs; the least depth in the pass is 5½ fathoms (10^{m}1) nearly in mid-channel.

Passagem de Niuni.—**Dangers.**—This pass is entered between Mwamba Tambula and a reef which extends from about 5 to 12 miles east-north-eastward of Cabo Msange on which stand Kifuki island and Mtundo island. Sand cay and Makunga islet lie on the north-eastern edge of the reef, close off the eastern side of Mtundo island; they are each about 8 feet (2^{m}4) high and inconspicuous, but a boulder, 23 feet (7^{m}0) high, lies on the reef between them and is very conspicuous. South-eastward of Kifuki island and Mtundo island, the reef extends from one to 1½ miles offshore.

There are depths of over 100 fathoms (182^{m}9) in the outer part of the pass, but the depths decrease very rapidly near its inner part, and there are depths of from 9 to 18 fathoms (16^{m}5 to 32^{m}9) in its narrowest part.

A bank, on which the depths are less than 5 fathoms (9^{m}1), extends

Chart 658.

about 2½ miles north-north-westward of Niuni islet; Gray patches, several patches with depths of 2¾ and 3 fathoms ($5^{m}0$ and $5^{m}5$), lie on this bank, and there is a detached 3-fathom ($5^{m}5$) patch, on the northern side of the pass, about 1¾ miles southward of Kifuki island.

Islands and dangers within the outer reefs.—Passagem de Mionge.—Pedra Massassari is a very dark and almost square rock, about 3 feet ($0^{m}9$) high, and prominent, which lies about 3 miles north-eastward of Ilha Mionge; there are shoal depths within about half a mile north-westward and south-eastward of the rock, and a drying sandbank lies about one cable north-westward of it.

Ilha Meshanga (Mshanga) (*Lat. 11° 21′ S., Long. 40° 32′ E.*), about 2½ miles north-westward of Pedra Massassari, is a wooded, coral island, 54 feet ($16^{m}5$) high, situated on a reef which extends about one mile eastward and southward; a rock, awash, lies about 1¾ miles westward of Ilha Meshanga.

Extensive coral reefs, with numerous sandbanks and detached rocks, extend northward between Ilha Meshanga and Cabo Msange, of which the following are named; Pedra Luvinza (Lwinza), a rock, 6 feet ($1^{m}8$) high, situated about 1½ miles north-eastward of Ilha Meshanga; Mwamba Quissanga (Mwamba Kisanga Mungu) a coral reef, which dries 9 feet ($2^{m}7$), situated about 2 miles north-north-eastward of Ilha Meshanga; and Ilha Congo, 35 feet ($10^{m}7$) high, situated about 5 miles northward of Ilha Meshanga. Passagem de Mionge lies between the reef which connects Raz Ulu to Ilha Mionge and the reef which extends southward of Ilha Meshanga.

Porto de Mocímboa da Praia.—Dangers.—Channel.—The reef connecting Raz Ulu and Ilha Mionge extends as much as 1¾ miles northward of the latter islet, and there are several sunken rocks near its north-eastern extreme.

Between Raz Ulu and Ponta Levura, the southern side of the harbour is fronted by an extensive bank, the inner part of which is mud, and dries, and the outer part of which is coral and sand, and extends as much as 2½ miles offshore in places; Restinga Mwamba Msaro, a spit extending north-eastward from this bank, lies about 2½ miles north-north-westward of Ras Ulu, and Restinga Kiwanda, another extension north-westward, lies about 2 miles east-north-eastward of Ponta Levura.

A shoal, with a depth of one fathom ($1^{m}8$) over it, lies about 3 miles east-north-eastward of Ponta Levura.

Between Ponta Vermelha and Cabo Msange, the north-western side of the harbour is fringed with a drying bank, which extends about one mile offshore, on the north-eastern part of which are several detached rocks; Mwamba Kisocha, a coral reef which dries in places, lies on the above bank, and extends as much as 3 miles offshore, about 5 miles east-north-eastward of Ponta Vermelha (*Lat. 11° 20′ S., Long. 40° 23′ E.*).

Restinga Mwamba Kisocha, a bank, on which there are depths of from one fathom to 2¼ fathoms ($1^{m}8$ to $4^{m}1$), extends about one mile southward of Mwamba Kisocha, and a rock with less than 6 feet ($1^{m}8$) over it, lies off the southern edge about 2½ miles eastward of Ponta Vermelha.

An intricate channel, with a least depth of 3¼ fathoms ($5^{m}9$), leads close to the north-western side of the harbour, passing between the

Charts 2762, 597, 748b, 2483.

Chart 658.

reefs which extend northward and north-westward of Ilha Congo and those that fringe Cabo Msange; Jeffreys rock, a pinnacle, with less than 6 feet ($1^{m}8$) over it, lies almost in mid-channel, about 2¾ miles west-north-westward of Ilha Congo.

Buoys.—The approach to the harbour is buoyed in accordance with the uniform lateral system, *see* page 32; the buoys are not to be depended on. The port-hand side of the channel entering is marked by even-numbered buoys, painted red and surmounted by cylindrical topmarks. The starboard-hand side of the channel entering is marked by odd-numbered buoys, painted black and surmounted by conical topmarks.

No. 2 red buoy is moored about 5 cables north-eastward of Baixo Bower.

No. 1 black buoy is moored about 2½ cables southward of Pedra Massassari.

No. 4 red buoy is moored about 1¾ miles northward of the north-western end of Ilha Mionge, and marks the northern edge of the reef connecting the islet to Raz Ulu.

No. 6 red buoy is moored about 2¼ miles north-north-westward of Raz Ulu, and marks the eastern edge of the reef extending from Ponta Levura.

No. 8 red buoy is moored about 3 miles east-north-eastward of Ponta Levura, and marks the north-eastern side of a one-fathom ($1^{m}8$) shoal.

No. 10 red buoy is moored about 2 miles north-eastward of Ponta Levura.

No. 3 black buoy is moored about 1½ miles north-eastward of Ponta Vermelha (*Lat. 11° 20′ S., Long. 40° 23′ E.*), and marks the north-eastern limit of the inner anchorage.

No. 5 black buoy is moored about 7½ cables east-south-eastward of Ponta Vermelha, and marks the north-western limit of the inner anchorage.

No. 12 red buoy is moored about 7½ cables south-eastward of Ponta Vermelha, and marks the south-western limit of the inner anchorage.

Tidal streams.—Within the harbour, the westward-going tidal stream on the rising tide is scarcely appreciable, but the eastward-going tidal stream on the falling tide attains a velocity of from 2 to 3 knots at springs.

Anchorages.—Anchorage may be obtained as convenient between the outer and the inner line of reefs, in depths of from 6 to 11 fathoms ($11^{m}0$ to $20^{m}1$); a good berth is about 3 miles westward of Ilha Tambúzi light-structure, in a depth of 9 fathoms ($16^{m}5$), sand and coral, with the summit of Ilha Mionge bearing about 234°. In Passagem de Mionge the depths are too great for convenient anchorage, but anchorage, in depths of from 5 to 10 fathoms ($9^{m}1$ to $18^{m}3$), mud, may be obtained both outside and within the pass. Within the harbour, a good berth is in 8 fathoms ($14^{m}6$), with Ponta Vermelha bearing 278°, and Raz Ulu bearing 146°, or smaller vessels may anchor, in a least depth of 21 feet ($6^{m}4$), within the area contained by Nos. 3, 5, 10 and 12 buoys.

Directions.—**Caution.**—Vessels may pass through the outer reefs by any of the passes described above, but once within the outer reefs, Porto de Mocímboa da Praia should always be entered by

Charts 2762, 597, 748b, 2483.

Chart 658.

Passagem de Mionge, as the channel along the north-western shore of the harbour is narrow, tortuous and devoid of suitable leading marks. The following track is recommended:—Vessels should enter Passagem de Tambúzi steering for the north-western extreme of Ilha Mionge, bearing 265°, until Raz Ulu shows up clearly, when the latter point should be steered for, bearing 272° passing close to No. 2 buoy and about one mile southward of No. 1 buoy and Pedra Massassari. When Pedra Massassari bears 027°, course should be altered to 300°, passing close to No. 4 red buoy and between the white and the red beacons on the reefs on the southern and northern sides of the channel. Continue on this course and round, on the port-hand, No. 8 red buoy which marks the north-eastern side of the one-fathom (1^{m}8) shoal. After rounding No. 8 buoy, anchor as convenient. A vessel proceeding to the inner anchorage should anchor in the triangular area between Nos. 3, 5 and 12 buoys.

When approaching the inner part of the harbour, Ilha Tambúzi light-structure bearing 098°, and just open of Ilha Meshanga, forms a useful stern mark.

In the event of the buoys not being in position, the following directions should be followed:—Approach with the western extremes of Ilha Tambúzi and Ilha Suna, in line; pass on either side of Baixo Bower, if southward on a bearing of Ilha Mionge, if northward on a bearing of Pedra Massassari. Steer to pass about three-quarters of a mile southward of Pedra Massassari, and when Ilha Congo is in line with the eastern extreme of Ilha Meshange, steer 292° for Ponta Vermelha until the western extremes of Ilha Meshange and Ilha Suna are in line, when course should be altered gradually northward to the line of the stern-mark described above.

If approaching by Passagem de Suna, enter the passage in mid-channel, on a bearing of Ilha Suna (*Lat. 11° 18′ S., Long. 40° 35′ E.*), afterwards passing on either side of Pedra Massassari, and thence proceeding as directed above.

If approaching by Passagem de Niuni enter the pass with Cabo Msange bearing 288°; when the western extreme of Ilha Suna is in line with the eastern extreme of Ilha Mionge, Gray patches will have been passed, and course may be shaped for the western extreme of Ilha Tambúzi, bearing 167°, until past the reef extending eastward of Ilha Suna, whence course should be shaped to pass on either side of Pedra Massassari, thence proceeding as directed above.

Head of harbour.—Light.—Mto Mocímboa, the creek at the head of the harbour, is fringed with sand and mud flats, and its entrance is obstructed by Lipulula (Lepulula) a small island, from which rocks extend in various directions. A narrow and tortuous channel, which is only available to small craft at high water, leads southward of the island of Lipulula to the town of Mocímboa, and to the mouth of a small river which enters the creek at its north-western corner.

A light is exhibited, at an elevation of 21 feet (6^{m}4), from a white, concrete tower with a gallery, 15 feet (4^{m}6) in height, situated on the head of a pier at Mocímboa (*Lat. 11° 20′ S., Long. 40° 22′ E.*).

Town.—Mocímboa de Praia stands on the southern side of Mto Mocímboa, abreast Ilha Lipulula. A limited quantity of provisions may be obtained. There is a hospital and an airport southward of the town.

Charts 2762, 597, 748b, 2483.

Chart 658.

Communication.—There is regular communication by sea with Europe, South Africa and with other East African ports.

ILHA MEFUNVO TO CABO DELGADO (*continued*).—**Coast.**—Between Cabo Msange, described on page 293, and Ras Nondo, about 10 miles northward, the coast is low and wooded with occasional small villages surrounded by coconut groves; a group of casuarina trees which, in 1897, were 80 feet (24^{m}4) in height, may readily be identified from the southward.

The coast is fronted by a sandbank, the inner part of which dries, and the outer part of which extends as much as 4 miles offshore in places; the depths on this bank vary from 3 feet (0^{m}9) to 3 fathoms (5^{m}5), and landing is impracticable except at high water.

Kifuki pass and Mtundo pass.—The southern part of the coast between Cabo Msange and Ras Nondo, is approached through Kifuki pass, a pass about 2½ miles wide between the edge of the reef extending eastward from Cabo Msange and Kifuki island. There are depths of from 7 to 10 fathoms (12^{m}8 to 18^{m}3) in the outer part of the pass, approach to which may be made passing either side of Gray patches.

The northern part of the above stretch of coast is approached through Mtundo pass, which is entered between Mtundo island and Ilha Uamize (Wamizi island), about 7 miles northward. Ilha Uamize is low and wooded, with several high clumps of trees, which, when seen from a distance, resemble hills. In 1874, a single, prominent tree, stood on the western extreme of the island, which is situated about 2 miles eastward of Ras Nondo, the intervening channel being only available for boats. Ilha Uamize is surrounded by a reef, which extends as much as 1½ miles off the southern coast of the island.

There are depths of over 100 fathoms (182^{m}9) in the outer part of the pass, but the depths decrease very rapidly, and there are numerous reefs and shoals a short distance within the entrance.

Dangers in Kifuki pass.—**Tidal streams.**—**Anchorage.**—The western extreme of Kifuki island (*Lat. 11° 10′ S., Long. 40° 35′ E.*) is steep-to and may be rounded at a distance of about 4 cables, but the bank fringing Cabo Msange extends as much as 2 miles eastward. A detached coral shoal, with a least depth of 4¼ fathoms (7^{m}8), lies in mid-channel in the inner part of the pass, about 1½ miles westward of the western extreme of Kifuki island.

The northward-going tidal stream attains a velocity of from 2 to 3 knots at springs, but is scarcely perceptible at neaps.

Good anchorage, in depths of 5 or 6 fathoms (9^{m}1 or 11^{m}0), sand and coral, may be obtained about 7 or 8 cables northward or southward of the western extreme of Kifuki island, according to the monsoon prevailing.

Islets and dangers in Mtundo pass.—**Depths.**—Mtundo island is described on page 294.

Fungu Makunga is a bank on which the depths are less than 5 fathoms (9^{m}1), with some detached patches of 2¾ and 3 fathoms (5^{m}0 and 5^{m}5), which extends about 3½ miles north-eastward of Mtundo island; the sea breaks heavily on these patches at low water in the swell which generally prevails.

Charts 2762, 597, 748b, 2483.

Chart 658.

Mwamba Mtundo, a reef of coral and sand, which partly dries, lies about 1½ miles northward of Mtundo island.

Gulnare reef, a drying reef which is steep-to, lies about 2½ miles north-westward of Mtundo island; violent tide rips are experienced close northward of Mwamba Mtundo, and in the channel between it and Gulnare reef, and vessels are advised not to attempt this channel.

Kisungura is a wooded islet, situated about 2 miles northward of Kifuki island; Vumba is a similar islet, about 1½ miles farther northward, and a small islet, 4 feet ($1^{m}2$) high, and shaped like a mushroom, stands in the centre of a coral reef, about 1½ miles north-eastward of Vumba islet.

Penguin shoal, with a least depth of one fathom ($1^{m}8$), lies nearly opposite the centre of Mtundo pass, about 4 miles north-eastward of Vumba islet.

There are depths of from 7 to 10 fathoms ($12^{m}8$ to $18^{m}3$) in the channel between Penguin shoal and Ilha Uamize, and, except in the case of small craft, this channel should be used by all vessels seeking anchorage within Mtundo pass. There are depths of from 4 to 6 fathoms ($7^{m}3$ to $11^{m}0$) in the channel between Penguin shoal and Gulnare reef, but the depths decrease to 3¼ fathoms ($5^{m}9$), between Kisungura and Vumba islets, and there are patches of 2¼ and 2½ fathoms ($4^{m}1$ and $4^{m}6$), and although a small vessel might use this passage, it is not recommended. The passage westward of Vumba islet has a least depth of 3¾ fathoms ($6^{m}9$), and is only practicable for small craft. The best time to enter these channels is at low water, when the reefs are clearly defined.

Anchorage.—Directions.—Anchorage, in depths of 7 fathoms ($12^{m}8$), may be obtained about three-quarters of a mile westward of Penguin shoal, with the western extreme of Vumba islet bearing 212°, and Ras Nondo bearing 314°.

In order to clear Fungu Makunga, vessels from southward should keep the eastern extreme of Ilha Uamize bearing less than 347°, until Vumba islet bears 246°; from the latter bearing, Vumba resembles two small, distinct, black lumps. After clearing Fungu Makunga, Ras Nondo should be brought to bear 293° until the vessel is northward of Penguin shoal, whence course may be gradually altered westward and south-westward, and anchorage obtained, as described above.

Maiyapa bay.—Uamize pass.—Maiyapa bay is entered between Ras Nondo (*Lat. 11° 02′ S., Long. 40° 34′ E.*) and Ponta Ponzi (Ras Afunji), a bold and sandy point about 12 miles north-north-eastward. Except in its south-western corner, where there are mangroves, the shores of the bay are sandy, the only prominent features being three tall fir trees, which, in 1874, stood on the southern shore, the centre and tallest being situated about 2½ miles west-north-westward of Ras Nondo. On the northern shore of the bay, there are several villages among coconut groves.

An extensive sandbank, the inner part of which dries, and the outer part of which extends in places as much as 4 miles offshore, fronts the shores of the bay and considerably restricts the space available for anchorage. At the south-western corner of the bay, there is a narrow inlet between drying sandbanks, known as Porto Mluri, the head of which is formed by the two creeks of Mto Mluri and

Charts 2762, 597, 748b, 2483.

Chart 658.

Mto Maiyapa; the village of Marongo, at which a few fresh provisions may be available, stands on the western side of Porto Mluri, about 1½ miles from its head.

Maiyapa bay is approached through Uamize pass, a pass which is entered between Ilha Uamize and Ilha Rongui (Rongwi island) about 8 miles northward.

Ilha Rongui is low, flat and densely wooded; its outer coast is principally sandy beaches with a few parts rocky, and from seaward the only distinguishing features are two rounded-clumps of trees, which, in 1874, were 94 feet ($28^{m}7$) high, on its north-eastern part.

The island stands on an extensive coral reef which fronts the coast, about 2 miles eastward of Ponta Ponzi; Ponzi channel, the intervening channel, is so obstructed by reefs and shoals as to be unavailable for any craft without local knowledge. The reef surrounding the island extends about one mile from its eastern coasts, and is steep-to and clear of dangers, except south-eastward, where it is broken up, and there are several detached, black rocks, which dry, and some detached shoals; the outermost of these, Pollard shoal, a patch with a least depth of 1½ fathoms ($2^{m}7$), lies about 3 miles south-eastward of Ilha Rongui. Except for a narrow channel, in which there are depths of a few feet only, the reef surrounding Ilha Rongui, extends nearly 5 miles northward, and on its northern part stands Ilha Tecomadji (Tekomaji island), described on page 302; with any swell, the sea breaks across the intervening channel.

Islets and dangers within Uamize pass.—Mkunga is a small islet, 30 feet ($9^{m}1$) high, situated on the reef close northward of the northern extreme of Ilha Uamize.

Mwamba Mpanga-panga is a reef of coral and sand, which dries in places, situated about 2½ miles northward of the western extreme of Ilha Uamize; it is steep-to on all sides, and the sea generally breaks on it below half tide.

Keramimbi is a thickly-wooded islet, 40 feet ($12^{m}2$) high, lying about 2 miles south-south-westward of the southern extreme of Ilha Rongui, with depths of only 6 feet ($1^{m}8$) in the intervening channel; patches of reef and sunken rocks extend about 1½ miles southward of Keramimbi islet (*Lat. 10° 55′ S., Long. 40° 38′ E.*).

Tidal streams.—Anchorages.—In Maiyapa bay, the tidal stream of the rising tide sets south-westward, and the tidal stream of the falling tide, south-eastward, at rates of from one knot to 2 knots at springs.

Anchorage, in depths of 9 fathoms ($16^{m}5$), sand and coral, may be obtained about one mile northward of Mwamba Mpanga-panga, with Mkunga islet bearing 113°, and the eastern extreme of Keramimbi islet, bearing 012°.

Anchorage may also be obtained, in depths of 6 fathoms ($11^{m}0$), sand and coral, about 5 cables south-westward of Mwamba Mpanga-panga, with Uamize single tree bearing 184°, distant 2 miles; in this position, in 1875, H.M.S. *Nassau* rode out a strong south-easterly gale in smooth water, and it would be equally well-sheltered during the north-east monsoon, as the ocean swell is not felt here.

Within Maiyapa bay, the bottom is sand and coral, except off the entrance to Porto Mluri, where it is mud. Good anchorage, although

Chart 658.

rather exposed to the ocean swell, may be obtained, in depths of 7½ fathoms (13^{m}7), with Uamize single tree bearing 162°, the eastern extreme of Uamize bearing 113°, and the southern extreme of Keramimbi islet, bearing 080°.

Within Porto Mluri, small vessels may obtain anchorage, in depths of from 7 to 10 fathoms (12^{m}8 to 18^{m}3), black adhesive mud, but the confined space restricts the use of the anchorage to small craft, and the entrance to Porto Mluri is narrow and tortuous, with a 9-foot (2^{m}7) patch in mid-channel.

Directions.—Vessels should enter Uamize pass, passing about 2 miles northward of Mkunga islet, thence steering about 250° until that islet bears 113°, when it should be brought astern on that bearing, and a course of 293° steered, which will lead to the anchorage northward of Mwamba Mpanga-panga.

Vessels anchoring in Maiyapa bay may pass northward or southward of Mwamba Mpanga-panga, but the northern channel is recommended on account of the more gradual decrease in depths; the shoals on both sides of the southern channel are steep-to.

If entering by the northern channel, follow the directions given above, until the south-eastern of the three tall trees on the southern shore of the bay, bears 234°; steer for it on this bearing until Uamize single tree bears 173°, when course should be altered to 327°, which course will lead to the anchorage in Maiyapa bay.

If entering by the southern channel, when Uamize single tree bears 234°, steer for it on that bearing, until a noticeable rise, formed by a clump of trees, which, in 1874, was 80 feet (24^{m}4) high, situated about 1¾ miles westward of the eastern extreme of Ilha Uamize bears 103°; with this rise as a stern-mark, steer 283°, until Uamize single tree bears 184°, whence course should be altered to 327°, which will lead to the anchorage in Maiyapa bay.

Charts 690 and 658.

Tunghi bay and approaches.—Light.—Signal station.—Dangers.—Tunghi bay or Porto Palma is entered between Ponta Ponzi and Cabo Delgado, about 8 miles northward. The village of Palma (*Lat. 10° 47′ S., Long. 40° 29′ E.*) stands on the western bank of Mto Mnangani, a creek which is entered at the head of the bay, about 8½ miles west-north-westward of Ponta Ponzi and the village of Kiuya or Tunghi, stands on the northern shore, about 3 miles westward of Cabo Delgado; the latter village is hidden by a dense belt of mangroves, but its position may be identified by a thick grove of coconuts. A sandy beach extends round the shores of the bay, between Ponta Ponzi and Kiuya, whence the shore is rocky to Cabo Delgado.

The head of the bay is backed by a wooded ridge, which forms the highest ground in the vicinity, and on the summit of which, about one mile westward of the entrance to Mto Mnangani, there was, in 1874, a conspicuous baobab tree, 250 feet (76^{m}2) high; about one mile farther northward was a compact group of these trees, 288 feet (69^{m}5) high, with a road leading up to the summit of the ridge, which is prominent. The land within the southern shore of the bay, is low and flat, but within the northern shore, it rises to between 80 and 200 feet (24^{m}4 and 61^{m}0) high. Cabo Delgado is low, but close northward of it is a hill, 85 feet (25^{m}9) high, and there was, in 1874,

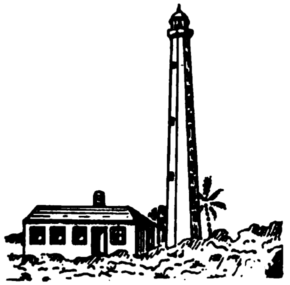
Charts 2762, 597, 748b, 2483.

Charts 690 and 658.

a conspicuous palm tree, 75 feet (22^{m}9) high, about half a mile westward of its southern extreme.

Chart 690.

A light is exhibited, at an elevation of 134 feet (40^{m}8), from a white, hexagonal, concrete tower and dwelling, 118 feet (36^{m}0) in height, near the extreme of Cabo Delgado (*Lat. 10° 42′ S., Long. 40° 39′ E.*).



Cabo Delgado lighthouse from eastward.
(*Original dated* 1949.)

There is a signal station at the lighthouse.

Chart 658.

Ilha Tecomadji lies in the southern approach to Tunghi bay, about 4 miles north-eastward of Ponta Ponzi; it stands on the northern part of the reef which surrounds Ilha Rongui, described on page 300, which extends as much as 1¼ miles north-eastward of Ilha Tecomadji, its outer edge being steep-to and usually marked by surf. Ilha Tecomadji is low, flat and densely wooded; in 1874, there was a noticeable single fir tree on its north-western extreme, and, when viewed from about 6 miles eastward, three fir trees could then be seen on its eastern coast.

Charts 690 and 658.

Drying banks of sand and coral, extend about one mile offshore between Ponta Ponzi and Kiuya village, and Cabo Delgado is fringed by a drying reef, which extends over one mile south-eastward. The latter reef is steep-to, and is usually marked by surf, but within the bay, the shores are fronted by extensive banks, on which the depths are less than 3 fathoms (5^{m}5), and on which there are several sunken rocks, which extend nearly 3 miles offshore in places.

Chart 658.

A spit, with a least depth of 3½ fathoms (6^{m}4), projects nearly 4½ miles offshore, southward of the village of Kiuya, and there are detached patches, with depths of 2¾ and 2½ fathoms (5^{m}0 and 4^{m}6), situated about 3 and 6½ miles, respectively, south-westward of Cabo Delgado.

Buoys.—Caution.—Since the establishment of the buoys marking the channel, the uniform lateral system of buoyage, *see* page 32, has been established, and it is therefore possible that the colours of the buoys have been altered to conform with this system.

A red, can buoy, surmounted by a staff, is moored about 3½ miles west-north-westward of the north-western extreme of Ilha Tecomadji, and marks the southern extreme of the spit extending southward from abreast the village of Kiuya.

A red, spherical buoy is moored about 6½ miles west-south-westward of Cabo Delgado (*Lat. 10° 42′ S., Long. 40° 39′ E.*), and marks the southern side of a 2½-fathom (4^{m}6) patch in that position.

A black, conical buoy is moored about 2 miles east-north-eastward of the entrance to Mto Mnangani, and marks the northern edge of the bank extending from the southern shore.

Tidal streams.—Anchorage.—In Tunghi bay, the tidal stream of the rising tide sets south-south-westward, and that of the falling tide sets north-by-eastward, at rates of from one knot to 2 knots.

Charts 2762, 597, 748b, 2483.

Chart 658.

Good anchorage, in regular depths of about 10 fathoms ($18^{m}3$), may be obtained between the inner red buoy and the black, conical buoy, and there is also anchorage in depths of about 9 fathoms ($16^{m}5$), mud, with the group of baobab trees bearing 269°, distant about 5 miles; the bay, however, is exposed to the ocean swell, and, during either monsoon, better shelter may be obtained westward of the north-western extreme of Ilha Tecomadji.

In 1875, H.M.S. *Nassau* rode out several gales, both north-easterly and south-easterly, in a depth of 4¾ fathoms ($8^{m}7$), sand and coral, with Tecomadji single fir tree bearing 129°, distant one mile. This berth is too near the reef for a large vessel, and a better position would be with the fir tree bearing 106°, distant about 1½ miles, and Ponta Ponzi bearing 173°, distant 3¾ miles.

Directions.—Vessels entering Tunghi bay in the morning may identify the single palm tree near Cabo Delgado, and the group of baobab trees on the ridge within the head of the bay, and, if approaching from northward, the single tree on the north-western extreme of Ilha Tecomadji will appear as the extreme of the island. During the afternoon, difficulty may be experienced in the identification of some of these features, as a haze generally covers the mainland, but the extremes of Cabo Delgado and Ilha Tecomadji will be visible.

The group of baobab trees, bearing 263°, leads in mid-channel through the entrance to Tunghi bay, but in strong south-easterly winds, it is advisable to keep slightly southward of mid-channel. If proceeding to the anchorage at the head of the bay, the following directions, which were those used in 1875, may be of use in the event of the buoys not being in position:—

Enter with the group of baobab trees bearing 263°, and when Ponta Ponzi (*Lat. 10° 50′ S., Long. 40° 37′ E.*) bears 170°, steer 227° until Tecomadji single fir tree bears 100°, or the group of baobab trees bears 272°, when course should be altered for the group of trees on the latter bearing, which will lead to the anchorage.

Mto Mnangani.—Village.—Mto Mnangani, at the head of the bay, is about 3 cables wide at its entrance, but drying banks on either side reduce the width of the navigable channel to less than one cable. The channel is marked by black and red beacons, and has a least depth of 4 feet ($1^{m}2$) in places; it is reported to be available for canoes for about 1½ miles within the entrance.

The village of Palma is situated on the western bank of Mto Mnangani, about 1½ miles above its entrance; there are a few European houses and a military barracks.

In 1875, the fever months here were coincident with the principal rainy months, viz., February to May.

Charts 2762, 597, 748b, 2483.

CHAPTER VIII

CABO DELGADO TO RAS NDEGE, INCLUDING MTO RUFIJI AND MAFIA ISLAND AND CHANNEL

Chart 690.

CABO DELGADO TO RAS SHUKA.—Coast.—Between Cabo Delgado and Cape Ruvúma or Ras Swafo (*Lat. 10° 29′ S., Long. 40° 32′ E.*), about 14 miles north-north-westward, the coast is low and thickly wooded, and is fronted by reefs on which the sea generally breaks heavily, rendering the reefs visible from some distance seaward. *See* view C on chart 690.

Mbwezi bay.—Mbwezi bay is entered between Cabo Delgado and Ras Nasunga, a low point about 6½ miles north-north-westward, which may be identified by the numerous detached rocks fringing it. At the head of the bay is a long white sandy beach which is fronted by reefs extending between half a mile and 1½ miles seaward; the outer edges of these reefs have boulders on them and are steep-to. The sea generally breaks on these outer edges and there may be comparatively smooth water within them, but there is, however, no anchorage in the bay and landing is seldom possible. The village of Mbwezi is situated in a coconut grove at the south-western corner of the bay.

Quionga bay and approaches.—Dangers.—Quionga (Keonga) bay is entered between Ras Nasunga and Ras Samadudu, about 4 miles north-north-westward. A shallow estuary, in which are several drying sandbanks, lies about 3 miles north-westward of Ras Nasunga at the head of the bay; it is formed by the confluence of three creeks, of which Mto Quionga is the southern, Mto Letonda the centre, and Mto Mwambi the northern.

Ras Samadudu and the coast for about 4 miles northward to Cape Ruvúma, is fronted by Mwamba Samadudu, an extensive reef which dries in places and extends as much as 1½ miles offshore; Mwamba Ricoma, the southern part of this reef, extends about 1¼ miles southward of Ras Samadudu and forms the northern boundary of Quionga bay.

A bank on which the depths are less than 5 fathoms ($9^{m}1$), and on which are several coral reefs, with rocks both sunken and awash, fronts the southern shore of the bay and extends nearly one mile offshore; outside this bank, the depths are irregular, and increase rapidly in places, leaving little anchorage space.

Anchorage.—The anchorage recommended is in a depth of about 7½ fathoms ($13^{m}7$), sand, with Ras Nasunga bearing 192°, the eastern extreme of the land near Cape Ruvúma bearing 327°, and the southern

Charts 1808, 669, 2762, 597, 748b, 2483.

Chart 690.

bank of Mto Quionga bearing 274°. Vessels should approach the anchorage with Ras Nasunga bearing 192°, and may anchor immediately a depth of 10 fathoms (18^{m}3) is obtained.

Creeks.—Buoys.—Quionga village is situated on a small ridge, 70 feet (21^{m}3) high, on the southern bank of Mto Quionga 2 miles within the entrance; the creek is frequented by trading dhows, but the channel is narrow and tortuous and boats should only ascend on a rising tide. Water is obtainable, but no other supplies are available.

The entrance to Mto Letonda, the centre creek, may be identified by the tall casuarina trees on its northern bank.

The northern creek, Mto Mwambi, is reported to be connected, at spring tides, to Mto Decomba, *see* page 306, by a passage available for canoes.

The channel into Mto Letonda is marked by buoys, and small craft may use this channel but local assistance should be obtained; it is stated that vessels must keep close to the southern bank when in the creek.

The fairway buoy, marked K1 in white, is a conical buoy, painted in red and black vertical stripes and surmounted by a St. Andrew's cross, moored about 2 miles eastward of the entrance to Mto Letonda.

K2 and K3 buoys, similar to K1 buoy but without topmarks, are moored in mid-channel, about 1¼ and half a mile eastward, respectively, of the entrance to Mto Letonda.

Ruvúma bay.—Dangers.—This large bay is entered between Cape Ruvúma and Ras Matunda (*Lat. 10° 21′ S., Long. 40° 27′ E.*), about 9½ miles north-north-westward; Mto Ruvúma flows into the head of the bay about 5 miles westward of Cape Ruvúma. Cape Ruvúma is low and thickly wooded, and there is a small conical hillock, 77 feet (23^{m}5) high, about a quarter of a mile within the cape, which is prominent when near the land. Ras Matunda may be identified by a series of white sandhills, about 80 feet (24^{m}4) high, with a single tall tree at their north-western end, which in 1874 extended close to the coast, for about one mile southward of the cape; the single tree was noticeable both from northward and southward.

Between Cape Ruvúma and the entrance to Mto Letokoto, a creek which is situated about 2 miles southward of Ras Matunda, the shores of the bay are fringed with mangroves, and at high water, form an almost continuous mangrove swamp. About 2½ miles northward of the mouth of Mto Ruvúma, there was, in 1874, a distinctive square clump of trees near the shore, and, 1¼ miles farther northward, there was a group of three tall trees, which, when seen from seaward, formed one of the most prominent features of the bay.

Kilima Mundo, a moderately sharp, well-wooded peak, 350 feet (106^{m}7) high, about 6 miles south-south-westward of the mouth of Mto Ruvúma, is the highest hill in the vicinity; Kilima Macheriuka, about 7 miles westward of the river's mouth, is the south-eastern shoulder of a flat-topped range stretching north-westward, and may be readily identified by three large baobab trees, which, in 1874, stood near the summit of its eastern face, one of which was at an elevation of 341 feet (103^{m}9). *See* view B on chart 690.

Mwamba Swafo, the northern part of Mwamba Samadudu, extends about three-quarters of a mile northward of Cape Ruvúma, and a bank on which the depths are less than 2 fathoms (3^{m}7) extends as

Charts 1808, 669, 2762, 597, 748b, 2483.

Chart 690.

much as 1½ miles north-eastward of Cape Ruvúma; the outer edge of this bank is steep-to and the tidal streams run strongly in the vicinity, so that Cape Ruvúma should be given a wide berth.

Except at the mouth of Mto Ruvúma, a bank on which the depths are less than 5 fathoms ($9^{m}1$), extends about one mile offshore between Cape Ruvúma and the remarkable group of three tall trees southward of Mto Letokoto, whence a drying reef fronts the coast as far as Ras Matunda, extending one mile eastward of that cape.

Tidal streams.—The in-going tidal stream or that of the rising tide, sets south-westward in Ruvúma bay and the out-going tidal stream sets north-westward; when Mto Ruvúma is high, the current from the river overcomes the in-going tidal stream and runs out constantly.

Anchorages.—**Landing.**—Good anchorage may be obtained in the southern part of the bay, in a depth of 10 fathoms ($18^{m}3$), mud, with Ras Matunda bearing 337°, Kilima Mundo bearing 226°, and the south-eastern extreme of Cape Ruvúma bearing about 125°; less swell is experienced here than in other parts of the bay.

Good anchorage may also be obtained in the northern part of the bay, in a depth of 10 fathoms ($18^{m}3$), mud, with Ras Matunda bearing 358°, and the remarkable group of three tall trees southward of Mto Letokoto, bearing 268°. Owing to the great depths found off the mouth of Mto Ruvúma, there is no anchorage close off its entrance, but convenient depths for anchoring, of from 6 to 8 fathoms ($11^{m}0$ to $14^{m}6$), are shown on the chart about 1¾ miles eastward of the entrance and about one mile offshore.

Landing is possible occasionally on a long, flat, sandy beach on the southern shore, between 1½ and 3½ miles westward of Cape Ruvúma (*Lat. 10° 29′ S., Long. 40° 32′ E.*), but landing is seldom possible between Mto Ruvúma entrance and Ras Matunda owing to the ocean swell and heavy breaking rollers.

Creeks.—About three-quarters of a mile westward of Cape Ruvúma is the entrance to Mto Decomba; the sea generally breaks heavily on the bar at its entrance, but it is sometimes possible for a boat to cross the bar at half tide. Within the bar, there are depths of from 2 to 3 fathoms ($3^{m}7$ to $5^{m}5$) for one mile, and it is reported to be connected to Quionga bay by a passage which is available for canoes at spring tides, *see* page 305.

Mto Mquango is a small creek which is entered about 3 miles westward of the entrance to Mto Decomba. The sea generally breaks heavily across its mouth, but it is reported that boats can enter at high water, springs. It is said to be navigable only for a short distance, even for canoes.

The entrance to Mto Letokoto, about 2 miles southward of Ras Matunda, has a bar across it, which dries; within the bar, it is reported to be navigable by canoes for about 15 miles, at which point it joins Mto Ruvúma.

Mto Ruvúma.—The entrance to Mto Ruvúma is not easily made out until abreast of it as there are several smaller openings both northward and southward of its mouth, but the muddy water from the river extends some distance seaward of the entrance, its termination being a clearly defined line.

Although there is no bar at the entrance, the very rapid increase

Charts 1808, 669, 2762, 597, 748b, 2483.

Chart 690.

in depths immediately outside its mouth, causes dangerous overfalls, especially during easterly winds ; at such times the sea breaks across the entrance and there is no safe passage for boats.

The entrance is nearly a mile in width but a drying sandbank extends from the north-western bank and contracts the channel to about 4 cables, and, during the period of the out-going tidal stream, the combination of river current and tidal stream is too strong at the entrance to be stemmed by a rowing boat.

The river is at its highest in March and at its lowest about October ; during the former month, there is a period about the middle of the month when the river rapidly subsides before rising again, nearly to its former height, at the end of the month.

The navigation of Mto Ruvúma depends greatly on the season, and when examined in September, 1874, during low river, the channel was obstructed about 2 miles within the entrance, by sandbanks which nearly dried ; above this point, navigation was intricate, the channel being narrow, with depths of only a few feet in places, and frequently crossing abruptly from bank to bank.

In 1861, during the period of subsidence in the middle of March, the river was ascended for about 30 miles by H.M.S. *Pioneer* ; depths of as little as 5 feet (1^{m}5) were found in places, the river current running at about 3 knots.

The river has been ascended by boats for about 156 miles, the ascent occupying 15 days and entailing frequent dragging of boats over shallow parts.

Only scanty supplies of provisions are obtainable from the natives.

Mnasi bay and approaches.—From Ras Matunda (*Lat. 10° 21′ S., Long. 40° 27′ E.*), the coast trends north-north-westward for 4 miles, forming the eastern side of a peninsula whose northern extreme is Ras Ruvura. Between Ras Ruvura and Ras Msamgamku about 11½ miles west-north-westward, the coast is fronted by a broad coral reef which dries in places and which extends south-eastward from Ras Msamgamku to within a mile of Ras Ruvura, and affords shelter to a large sheet of water known as Mnasi bay, which is thus completely enclosed except for Msimbati channel, a narrow entrance between Ras Ruvura and the south-eastern extreme of the reef.

Mana Hawanja island, which stands on the reef near its south-eastern end, about 1½ miles north-westward of Ras Ruvura, is covered with trees. Mongo island, situated on the reef about 1½ miles north-westward of Mana Hawanja island, is also thickly wooded and several tall trees near its north-western extreme are noticeable from northward ; about three-quarters of a mile south-westward of the south-western extreme of Mongo island, and connected to it by a drying sandbank, is Nakitumbe islet. *See* view A on chart 690.

Chart 690, plan of channel and anchorage of Msimbati.

Dangers in Mnasi bay.—Caution.—Owing to the imperfect nature of the survey, the plan must be used with caution.

The reef which fringes the coast between Ras Matunda and Ras Ruvura, extends over three-quarters of a mile northward of the latter point.

There are depths of from 20 to 44 fathoms (36^{m}6 to 80^{m}5) in the fairway of Msimbati channel, which is about 3 cables wide between the south-eastern extreme of the reef forming the western side of the

Charts 1808, 669, 2762, 597, 748b, 2483.

Chart 690, plan of channel and anchorage of Msimbati.

channel and a shore bank which fringes the eastern side of the channel between Ras Ruvura and Ras Msimbati, about 2 miles south-westward.

The southern and western shores of Mnasi bay, from Ras Msimbati to Ras Msamgamku are fringed with a drying bank of sand and coral which extends between half a mile and 1½ miles offshore.

Fungu Achumbu is a coral reef which partly dries, the northern extreme of which lies about one mile westward of Ras Msimbati; several shoal patches lie about three-quarters of a mile north-westward of Ras Msimbati, and there are numerous other sandbanks and coral patches in the bay, the position of which can best be seen on the chart. The north-western and south-eastern corners of the bay are shallow and foul, but the middle of the bay is clear, the bottom being sand and coral.

Tidal streams.—In Msimbati channel, the tidal streams attain rates of from 4 to 5 knots at springs, with heavy overfalls near the edge of the reef south-eastward of Mana Hawanja island. Very little tidal stream is felt within Mnasi bay, but outside the entrance the tidal streams attain velocities of from 2 to 3 knots at springs and follow the direction of the reefs, setting north-westward and south-eastward, being strongest near their edges; the south-eastward-going tidal stream is that of the rising tide.

Anchorage.—Landing.—Anchorage may be obtained in depths of from 10 to 15 fathoms (18^m3 to 27^m4), sand, north-westward of Ras Msimbati; should the wind be fresh from northward, a better anchorage will be found in depths of from 10 to 13 fathoms (18^m3 to 23^m8), southward of Mana Hawanja island.

Landing is difficult except at high water on account of the bank of sand and coral which fringes the shore of the bay.

Directions.—Vessels should enter Msimbati channel steering for Ras Msimbati, bearing 198°, and should keep on this bearing until the southern extreme of Mana Hawanja island bears 305°, when course should be altered to 218° in order to avoid a coral shoal, with depths of less than 3 fathoms (5^m5), which extends offshore northward of Ras Msimbati, until the latter point bears 170°, when course may be shaped for the anchorage. If anchoring southward of Mana Hawanja island, vessels should keep Ras Msimbati bearing 198° until the southern extreme of that island bears 316°, when course may be shaped as necessary for the selected anchorage.

In 1919, it was reported that Ras Msimbati, bearing 198°, led too close to the discoloured water off Ras Ruvura, and it is possible that the reef extends farther westward off that point than is charted. Vessels are recommended to enter or leave Mnasi bay at low water, or when the sun is high in altitude, at which times the edges of the shoals are easily distinguished.

Supplies.—Limited quantities of fresh provisions may be available at the small village of Mnasi, at the south-western corner of the bay.

Chart 684, 691.

Mikindani bay.—Light.—Mikindani bay is entered between Ras Msamgamku (*Lat. 10° 12′ S., Long. 40° 14′ E.*) and Cape Paman, about 6 miles westward; the depths in the bay are generally too great to afford anchorage, but sheltered anchorage may be obtained either in Mtwara harbour, entered on the southern side of the bay, about

Charts 1808, 669, 2762, 597, 748b, 2483.

Charts 684, 691.

3 miles south-westward of Ras Msamgamku or in Mikindani harbour, which is situated at the head of the bay, about 7 miles south-westward of Ras Msamgamku ; shelter may also be obtained by small craft in Misete creek, close eastward of the entrance to Mikindani harbour.

Mikindani bay can readily be identified by Mlima Mjoho, a distinctive, conical, wooded hill, 617 feet (188^{m}1) high, standing about 7 miles south-westward of Cape Paman. Both sides of the bay are low and thickly wooded ; nearly 2 miles south-westward of Ras Msamgamku, there was, in 1947, a prominent high tree, standing at an elevation of 105 feet (32^{m}0), while, fringing Cape Paman, are Hull rocks, a dense cluster of coral rocks covered with brushwood, which are easily identified. The head of the bay, over Mikindani harbour, is backed by hills, from 300 to 600 feet (91^{m}4 to 182^{m}9) high, and a conspicuous white house, with a tower, *see* sketch on chart 684, stands on the slope of Bismarck hill, a hill, 348 feet (106^{m}1) high, which rises close within the head of the harbour. *See* view A on chart 684.

A light is exhibited, at an elevation of 85 feet (25^{m}9), from a white-iron framework tower, 68 feet (20^{m}7) in height, situated on Ras Msamgamku.

Dangers in Mikindani bay.—Buoy.—Anchorage.—Except for the channels into Mtwara harbour, Misete creek and Mikindani harbour, the shores of Mikindani bay are fringed with coral reefs which dry in patches and which extend from 3 cables to 1½ miles offshore ; the outer edges of these reefs are steep-to. Mwamba Aveu, the north-western part of the reef which fringes Ras Msamgamku extends as much as 1½ miles northward of that point ; its south-western part, the extreme of which forms the eastern side of the entrance channel to Mtwara harbour is called Mwamba Ribunda. Westward of Ras Msamgamku, and about midway between Mwamba Aveu and Mwamba Ribunda, shoal water, with depths of less than 36 feet (11^{m}0), extends westward into Mikindani bay for about 3½ cables from the drying reef. Mwamba Shangani fringes the coast between the entrance channels to Mtwara harbour and Misete creek, and its extremes form the western and eastern sides, respectively, of those entrance channels. Mwamba Dadi fringes the coast between the entrance channels to Misete creek and Mikindani harbour (*Lat. 10° 16′ S., Long. 40° 08′ E.*).

The 20-fathom (36^{m}6) shelf off Mwamba Ribunda extends northward into the bay, for a distance of about 1¼ miles from the edge of the drying reef, and terminates in Shangani shoal, an area about 3½ cables in extent, over which there are general depths of less than 30 feet (9^{m}1), lying on the northern side of the approach to Mtwara harbour. There is a least depth of 13 feet (4^{m}0) near the north-western extremity of Shangani shoal, and another patch, with a least depth of 15 feet (4^{m}6) over it, lies near the north-eastern edge of the same shoal.

A red can buoy, moored in a depth of about 24 feet (7^{m}3), lies on the western side of Shangani shoal.

Lulu shoal, over which there is a least depth of 16 feet (4^{m}9), lies about 2½ cables south-eastward of Shangani shoal ; nearly 4 cables eastward of Lulu shoal, there is a detached shoal patch with a least depth of 15 feet (4^{m}6) over it.

The area between Shangani shoal (*Lat. 10° 13′ S., Long. 40° 12′ E.*) and Mwamba Ribunda is the only area in Mikindani Bay, where,

Charts 1808, 669, 2762, 597, 748b, 2483.

Charts 684, 691.

except for the dangers described above, the general depths are suitable for anchoring.

Pilotage.—Pilotage is compulsory southward of a line drawn in a 270° direction from Ras Msamgamku to the western shore of Mikindani bay.

Chart 691.

Mtwara harbour.—Entrance.—Beacons.—Buoyage.—Mtwara harbour is entered between Msemo point, a low sandspit, about 4 miles south-westward of Ras Msamgamku, and Ras Lichamelelo, about 3¼ cables north-westward. The entrance is approached through a channel, marked by beacons and leading beacons between Mwamba Ribunda and Mwamba Shangani, in which there are depths of from 13 to 23 fathoms ($23^{m}8$ to $42^{m}1$). At its narrowest part abreast Msemo spit, it is about 1½ cables wide; in spite of the sharp turn necessary in this vicinity, moderately large vessels can enter without difficulty about the time of slack water.

There are three pairs of prominent leading beacons for the approach to the harbour; they consist of iron framework structures, all painted white. The first pair of leading beacons, situated about 1¼ miles north-eastward of Msemo point, in line bearing 128°, lead southward of Shangani shoal; in 1948, the rear beacon of this alignment was obscured by trees within a few degrees of either side of the leading line. The second pair of leading beacons, situated nearly three-quarters of a mile north-eastward of Msemo point, in line bearing 154°, lead between Mwamba Shangani and Mwamba Ribunda; a high tree, standing at an elevation of 97 feet ($29^{m}6$), is situated about half-a-cable south-south-westward of the rear beacon of this alignment. The front beacon of the third pair of leading beacons is situated on Msemo point, and the rear beacon of this pair stands on Ras Jandoni on the southern shore of the harbour, about 3 cables north-westward of a conspicuous cliff and nearly 4 cables southward of Msemo point; in line bearing 189°, they lead between the reefs towards Msemo point (*Lat. 10° 15′ S., Long. 40° 12′ E.*).

The western side of the approach channel is marked by a beacon, painted red, situated about 7 cables north-north-eastward of Ras Lichamelelo, and a buoy painted black, about 1½ cables east-north-eastward of the above point. Two above-water rocks lie nearly one cable west-south-westward of the buoy.

The eastern side of the approach channel is marked by a beacon, painted white, which stands on the south-western extremity of Msemo spit.

The approaches to the harbour are thus well marked and the edges of the reefs forming the sides of the entrance channel, and Msemo spit, are steep-to; the channel itself is free from dangers. Within the harbour, however, there are numerous shoal patches with depths of less than 18 feet ($5^{m}5$) over them, the positions of which can best be seen from the chart.

A black conical buoy is moored about 2½ cables eastward of Ras Jandoni and marks the edge of shoal water in this vicinity.

A shoal, with a least depth of 15 feet ($4^{m}6$) over it, lies about 7¾ cables east-north-eastward of Ras Jandoni and is marked on its north-western side by a spherical buoy painted in red and white bands.

Foul ground extends north-eastward into the harbour for a distance

Charts 1808, 669, 2762, 597, 748b, 2483.

Chart 691.

of about one cable from the drying reef fringing Canoe point, situated about 8½ cables east-south-eastward of Ras Jandoni, and depths of less than 36 feet ($11^{m}0$) exist inshore of a black conical buoy moored about 3½ cables north-eastward of Canoe point (*Lat. 10° 16′ S., Long. 40° 12′ E.*).

A shoal, with a least depth of 12 feet ($3^{m}7$) over it, lies about 7 cables north-eastward of Canoe point and is marked on its south-western side by a spherical buoy painted in red and white bands; a rock awash, about 3 cables eastward of this shoal, is marked on its north-eastern side by a similar spherical buoy.

On the southern side of Mtwara harbour, about 1¾ miles east-south-eastward of Msemo spit, is the entrance to Mto Mtepwzi, a creek with depths of from 19 to 36 feet ($5^{m}8$ to $11^{m}0$) for about a mile within its entrance, whence the depths gradually decrease and the creek ends in a mangrove swamp about a mile farther southward.

Anchorage.—Mooring buoys.—The harbour provides good anchorage in depths of from 7 to 18 fathoms ($12^{m}8$ to $32^{m}9$), with a general holding ground of mud, but swinging space is considerably restricted by shoals. Good shelter is afforded from all winds; tidal streams, except near Msemo spit, are slight. The best temporary berth is near Msemo spit, in a depth of 14 fathoms ($25^{m}6$), sand, with the extreme of Msemo spit bearing 284°, and the conspicuous cliff on the south-western side of the harbour bearing 210°. A better permanent anchorage may be obtained farther up the harbour off the northern side, in depths of from 7 to 10 fathoms ($12^{m}8$ to $18^{m}3$), mud.

Two mooring buoys lie eastward of the black conical buoy situated 2½ cables eastward of Ras Jandoni; these are used as sternfast buoys by tankers which berth there with their anchors lying northward.

Tidal streams.—The direction and rate of the tidal streams in the entrance channel, in positions about half a mile north-north-eastward, and one cable southward, respectively, of Msemo spit beacon, are given in Tables B and A on the chart.

Directions.—Vessels entering Mtwara harbour should pass south-westward of Shangani shoal (*Lat. 10° 13′ S., Long. 40° 11′ E.*) and should approach on the alignments of the three pairs of leading beacons, as indicated on the chart, until nearly abeam of Ras Lichamelelo, when course should be altered as necessary for rounding Msemo spit. There is no difficulty in entering the harbour with the sun astern and a good lookout aloft, as the channel is then clearly defined by the colour of the water.

The tidal streams run sharply round Msemo spit and allowance should be made for them when rounding the spit. If entering with the in-going tidal stream, vessels should keep to the eastern side of the channel and round the spit close to, but if the out-going tidal stream is running, vessels should keep close to Mtwara town to allow for turning into the harbour.

Town.—Facilities.—Mtwara town is situated close within the entrance, on the south-western side of the harbour. A small quay, equipped with a crane, is situated near a factory on the southern side of Ras Lichamelelo, and a small pier, suitable only for boats, projects from another factory on the northern side of the town, about 3 cables south-westward of the same point.

In 1948, a deep-water quay about 1,100 feet ($335^{m}3$) in length, was

Charts 1808, 669, 2762, 597, 748b, 2483.

Chart 691.

under construction on reclaimed ground on the southern side of the harbour, midway between Ras Jandoni and Canoe point. There were no jetties, and no landing facilities for stores, in this vicinity.

A large floating crane was available in 1948; no other harbour craft were available in the port, but if these were required they were obtainable from Mikindani or Lindi.

Only a small quantity of fresh provisions were obtainable locally in 1948; a pipe-line, for the conveyance of fresh water from Mikindani, was under construction.

There are two hotels and a post office in the town.

Regular communication by air is maintained with Lindi and Dar es Salaam.

Mtepwezi village (*Lat. 10° 17′ S., Long. 40° 13′ E.*) is situated on the western side of the creek of that name, about a mile within its entrance; Ngwali village lies on the southern side of Mtwara harbour, near its head. There are several other small settlements on the northern side of the harbour.

Chart 684.

Misete creek.—This creek, which is entered through a narrow channel about three-quarters of a mile south-eastward of the entrance to the channel leading to Mikindani harbour, affords shelter to small craft in depths of from 2 to 3 fathoms ($3^{m}7$ to $5^{m}5$), sand and pebbles, in a basin at its head.

Chart 684, plan of Mikindani harbour entrance.

Mikindani harbour.—Entrance.—Dangers.—Mikindani harbour is situated at the south-western corner of Mikindani bay and affords secure anchorage in depths of about 7 fathoms ($12^{m}8$); it is entered between Gunia point, about 7 miles west-south-westward of Ras Msamgamku and Pemba point, about a quarter of a mile northward. The entrance is approached through a narrow channel between Mwamba Dadi and the edge of the reef which fringes the western shore of Mikindani bay; the channel is narrow, being only half a cable wide in places, and has depths of from 5¾ to 12 fathoms ($10^{m}5$ to $21^{m}9$), with a 5-fathom ($9^{m}1$) patch, described below, in the fairway. Useful marks in entering the harbour are Gunia point, Official's house, which is conspicuous, and the Custom house, a low white house, flanked by two small towers, situated at the south-western corner of the harbour, about 1¼ miles south-westward of Gunia point. *See* view on chart 684.

A bank on which the depths are less than 2 fathoms ($3^{m}7$), and on the northern edge of which is a rock which dries 2 feet ($0^{m}6$), extends northward of Mwamba Dadi, its northern extreme being nearly 1½ miles north-north-eastward of Gunia point.

A 5-fathom ($9^{m}1$) shoal lies in the fairway of the entrance channel, about 6½ cables north-eastward of Pemba point (*Lat. 10° 15′ S., Long. 40° 08′ E.*).

Within the harbour, the shores are fringed with a bank on which the depths are less than 2 fathoms ($3^{m}7$), which extend as much as a quarter of a mile offshore in places. A rock, with a depth of less than 6 feet ($1^{m}8$) over it, lies on the edge of the 3-fathom ($5^{m}5$) line about 2½ cables south-westward of Pemba point and a similar rock lies about 7 cables south-westward of Pemba point. About 1½ cables eastward of the latter rock is a 5-fathom ($9^{m}1$) patch; another 5-fathom ($9^{m}1$) patch lies about one cable south-westward of Gunia point.

Charts 1808, 669, 2762, 597, 748b, 2483.

Chart 684.

Beacon.—Buoys.—A beacon, consisting of a black tripod, surmounted by a white triangle, 20 feet ($6^{m}1$) in height, marks a rock awash, situated about 3½ cables north-eastward of the Custom house.

Chart 684, plan of Mikindani harbour entrance.

The western side of the entrance channel is marked by three black conical buoys, numbered 1, 3, and 5 from seaward. The eastern side of the channel is marked by four can buoys, numbered 2, 4, 6, and 8 from seaward; Nos. 2 and 6 are painted red, and Nos. 4 and 8 are painted in red and white chequers.

No. 7 black conical buoy is moored on the eastern side of the rock with a depth of less than 6 feet ($1^{m}8$) over it, about 7 cables south-westward of Pemba point.

Chart 684.

No. 9 black conical buoy is moored on the eastern edge of the projecting shore bank, about 9 cables south-westward of Pemba point.

The positions of the above buoys must not be relied on.

A buoy, painted in black and white chequers, is moored about 1½ cables northward of the Custom house as a guide for boats anchoring.

Anchorage.—Tidal streams.—A suitable anchorage berth is in a depth of about 6½ fathoms ($11^{m}9$), mud, with the Custom house bearing 215°, distant 8 cables.

The tidal streams in the harbour are scarcely perceptible.

Directions.—Vessels should approach the entrance channel from a position about one mile eastward of Ras Managumba, a sharp, rocky point, nearly 1½ miles northward of Pemba point, which has two villages close northward of it; no exact marks for passing between the reefs can be given, but in view of the heavy swell which sets in to the channel, vessels are advised to satisfy themselves as to the positions of the buoys, before entering.

Supplies.—Limited supplies of fresh provisions may be obtained at Mikindani village at the south-western corner of the harbour.

Communications.—There is regular communication by sea with other ports in Tanganyika Territory.

Mikindani is connected to the general telegraphic system.

Chart 1808.

Coast.—Between Cape Paman (*Lat. 10° 11′ S., Long. 40° 09′ E.*), *see* page 308, and Ras Mkya the eastern entrance point to Mto Sudi (Mgau Mwania), about 10 miles west-north-westward, the coast is low and fringed by a reef which extends between three-quarters of a mile and 1½ miles offshore. The only remarkable feature on this stretch of coast, is a dark clump of trees, 80 feet ($24^{m}4$) high, which, in 1878, was situated nearly 4 miles west-north-westward of Cape Paman. When abreast of Mto Sudi, Mlima Mjoho appears as the southern end of the range of hills which backs the coast.

Chart 865, plan of Mto Sudi.

Mto Sudi.—Caution.—Dangers.—Mto Sudi is a narrow creek or inlet which stretches about 5 miles southward; there are depths of from 5 to 15 fathoms ($9^{m}1$ to $27^{m}4$) in the fairway for about 3 miles within the entrance, and vessels may obtain anchorage in depths of from 6 to 9 fathoms ($11^{m}0$ to $16^{m}5$) close within the entrance or abreast the village of Sudi, which stands on the western bank about 2 miles farther up the inlet. A small white sandy beach at Sudi, and a

Charts 669, 2762, 597, 748b, 2483.

Chart 865, plan of Mto Sudi.

white Custom house close within it, both stand out well when seen from north-eastward.

Mto Sudi is entered between Ras Mkya and Ras Wambi, about 1½ miles west-north-westward, but both entrance points are fringed with reefs which contract the width of the channel to less than 2 cables in places.

From north-eastward, the entrance may be readily identified by a gap in the hills, and also by the Madjovi or Mushroom rocks, a group of rocks, the highest being 15 feet ($4^{m}6$) high, situated about 4 cables east-north-eastward of Ras Wambi. *See* view facing page 316.

Owing to the imperfect nature of the survey, the plan must be used with caution.

During the southern monsoon, in the afternoon with an east-south-easterly wind, and also when the northern monsoon is strong, the sea at times, appears to break nearly across the entrance.

Nymphe shoal, with a least depth of 15 feet ($4^{m}6$), lies in the fairway of the approach to the entrance channel, about 1½ miles north-eastward of Madjovi rocks.

Fungu Chosan and Fungu Gomani, the coral reefs fringing Ras Mkya and Ras Wambi, respectively, extend over a mile seaward of the entrance ; a bank on which the depths are less than 3 fathoms ($5^{m}5$), and on which there are several drying coral patches, extends as much as half a mile seaward of the edges of these reefs.

A sandspit, the inner part of which dries, extends about 3 cables westward of Ras Swa-swa, a projection on the eastern bank about 1¾ miles south-westward of Ras Mkya.

A bank, on which there are detached drying patches at from 2 to 3 cables offshore, fringes the western bank of the inlet southward of Ras Swa-swa.

Beacon.—Buoy.—A triangular beacon, 20 feet ($6^{m}1$) high, painted with black and white horizontal bands, stands on the coast at Dodongi village, about half a mile south-south-eastward of Ras Wambi.

A small buoy, surmounted by a blue flag, is moored off the northern edge of the spit extending westward of Ras Swa-swa (*Lat. 10° 08′ S., Long. 39° 59′ E.*).

Tidal streams.—Outside the entrance, the in-going tidal stream or that of the rising tide, sets northward, and the out-going tidal stream, or that of the falling tide, sets south-eastward ; during the southern monsoon, the north-going tidal stream is the stronger.

Anchorage.—Directions.—Temporary anchorage may be obtained south-westward of Nymphe shoal, in a depth of 9 fathoms ($16^{m}5$), sand and coral, with the highest Madjovi rock bearing 215°, distant about one mile.

A convenient anchorage for vessels of war is in mid-channel, in a depth of 9 fathoms ($16^{m}5$), abreast Mwania village, with the beacon at Dodongi village bearing 332°, distant 2½ cables ; there is also anchorage between Ras Swa-swa and Sudi village, in depths of from 6 to 8 fathoms ($11^{m}0$ to $14^{m}6$), mud.

Vessels should not approach within 2½ miles of the coast until the white Custom house at Sudi is in line with the gap in the distant hills, bearing 201°, when they may be steered for on this bearing, which line passes westward of Nymphe shoal, *see* view facing page 316.

Charts 1808, 669, 597, 748b, 2483.

Chart 865, plan of Mto Sudi.

Continue on this line until the highest Madjovi rock bears 224°, when course should be altered to 180° until the Custom house bears 204°, when it should again be steered for on the latter bearing until the beacon at Dodongi village is nearly abeam, when course may be shaped for mid-channel and the anchorage off Mwania village. With a good look-out kept, the reefs on both sides of the channel can clearly be made out, and, when the sun is astern, vessels can enter at slack water without difficulty, but great caution is necessary in the narrow channel.

If proceeding to the anchorage above Ras Swa-swa, continue in mid-channel, edging towards the western bank as Ras Swa-swa is approached. When abreast of the small river whose mouth is charted about 4 cables north-westward of Ras Swa-swa, course may be gradually altered southward, the sandspit rounded, and course shaped for the selected anchorage; the position of the sandspit is indicated by discoloured water, even at high tide.

Villages.—There are several villages on the banks of Mto Sudi, but Sudi village, the principal one, is the only one where good water may be obtained. Mkya village is situated about half a mile westward of Ras Mkya, and the larger village of Mwania lies about a quarter of a mile south-westward of Mkya.

Chart 1808.

Coast.—Light.—Between Ras Wambi, *see* page 314, and Ras Shuka, about 13 miles north-westward, the coast continues to be low and fringed with a reef extending between half a mile and 1½ miles offshore. About 4 miles north-westward of Ras Wambi and close to the coast, is an islet covered with dark trees, which is conspicuous.

Chart 681, plan of Lindi bay.

A light is exhibited, at an elevation of 50 feet (15^{m}2), from a white tower, 20 feet (6^{m}1) in height, situated on Ras Shuka (*Lat. 9° 59′ S., Long. 39° 49′ E.*).

LINDI BAY.—Aspect.—Lindi bay is entered between Ras Shuka and Ras Banura, a low cliffy point about 3¾ miles north-north-westward. Mto Lukuledi flows into the south-western corner of the bay and the town of Lindi is situated at its western entrance point. Vessels that can cross the bar outside the river's entrance may obtain sheltered anchorage in a narrow area in the river abreast the town.

The southern shore of Lindi bay is low but about 2 miles within the head of the bay, the hills rise to an elevation of nearly 1,000 feet (304^{m}8) and are well-wooded and cultivated in patches; Mlima Mdemba, 947 feet (288^{m}6) high, about 7 miles westward of Ras Banura, has a coconut grove on its summit. From seaward, the most conspicuous object is a group of white buildings on the high ground within Ras Shuka; Ras Rungi, a low cliffy point about 4½ miles westward of Ras Shuka, which forms the eastern entrance point to Mto Lukuledi, and a white cliff, 45 feet (13^{m}7) in height, at the centre of the head of the bay, about 2 miles westward of Ras Rungi, are also conspicuous, while, in the approach to the anchorage in Mto Lukuledi, Mlima Atu and Mlima Nuni may be readily identified.

Dangers in Lindi bay.—Depths.—Anchorage.—In the outer part of the bay, between Ras Shuka and Ras Rungi on the southern

Charts 669, 2762, 597, 748b, 2483.

Chart 681, plan of Lindi bay.

shore, and from Ras Banura to Ras Ekapapa, about 1½ miles west-south-westward, on the northern shore, the shores are fringed with reefs which dry and which extend as much as half a mile offshore in places. Fungu Myangi, the reef fringing Ras Shuka, is composed of dead coral and boulders and the sea breaks heavily on it at times. The outer edges of these reefs are steep-to and the depths outside them rapidly increase to over 100 fathoms (182^m9).

In the inner part of the bay between Ras Rungi and Ras Ekapapa, the depths decrease very rapidly, and the head of the bay is fronted by a bank on which the depths are less than 3 fathoms (5^m5), which extends nearly 2 miles from the western shore; Umtamar shoal, with a least depth of one fathom (1^m8), lies at the northern extreme of this bank about one mile north-north-westward of Ras Rungi.

During the northern monsoon, fair anchorage may be obtained off the northern shore of Lindi bay, south-eastward of Ras Ekapapa, in a depth of 8 fathoms (14^m6), sand, with the southern extreme of the coast eastward of Ras Ekapapa bearing 070°, and Ras Rungi bearing about 201°.

Pilotage.—Pilotage is compulsory westward of a line running southward from Ras Ekapapa to Ras Nongerungo (*Lat. 9° 58′ S., Long. 39° 47′ E.*) on the southern shore of the bay.

Chart 681, plan of Lindi harbour.

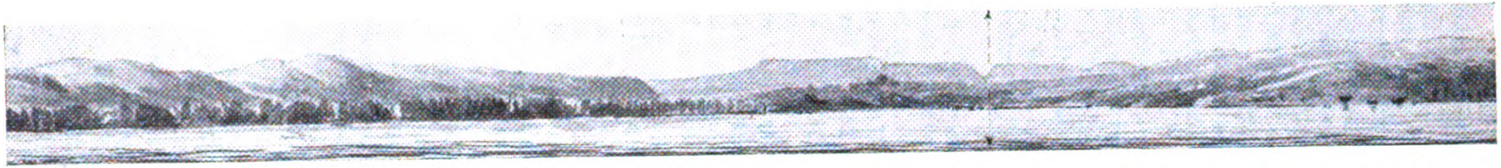
Mto Lukuledi.—Bar.—Dangers.—Mto Lukuledi is entered between Ras Rungi (*Lat. 9° 59′ S., Long. 39° 45′ E.*) and Ras Nando, nearly 1¾ miles south-westward. There is a bar across the entrance which extends from the shore about a quarter of a mile westward of Ras Rungi to Umtamar shoal; a least depth of 17 feet (5^m2) was reported in 1953, on the alignment of the leading light-structures in the channel across the bar, but vessels of a draught above 20 feet (6^m1) should not attempt to cross the bar without previous examination or the assistance of a pilot. With easterly winds, there is a steep swell on the bar during the period of the out-going tidal stream. Within the bar, the depths increase, and there are depths of from 7 to 10 fathoms (12^m8 to 18^m3) in a channel about 1½ cables wide abreast the town of Lindi.

A drying sandbank fringes Ras Nando and extends over half a mile north-eastward. Fungu Mbachiwonaki, a bank of sand and coral which dries at half tide, lies near the western bank of the river, its northern extreme being about 6 cables southward of Ras Nando; it is connected to the sandbank which fringes Ras Nando by another bank, over which a channel with a least depth of 5 feet (1^m5) leads to the landing pier abreast the town.

Lights.—Leading lights are exhibited north-westward of Ras Nando. The front light is exhibited, at an elevation of 22 feet (6^m7), from a white masonry obelisk, 12 feet (3^m7) in height, situated on the beach about 4 cables north-westward of Ras Nando. The rear light is exhibited, at an elevation of 178 feet (54^m2), from a white wooden beacon, 30 feet (9^m1) in height, standing on high ground about 5½ cables south-westward of the front light. The rear beacon is visible over palm trees on all bearings, but the front beacon is reported to be difficult to distinguish in the afternoon and evening, even in clear weather. These beacons, or at night, their lights, when in line, bearing 240°, lead through the channel across the bar.

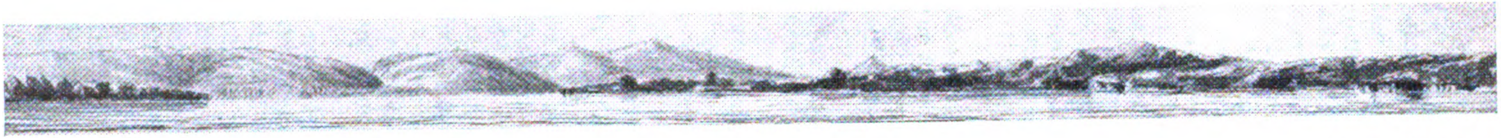
Charts 1808, 669, 2762, 597, 748b, 2483.

To face page 316.


Rao Mavinga.
Ras Mkya.
Ras Swa-Swa.
Right edge of white sand in line with gap in hills, bearing about 201°, (Custom Ho. not shown on view.)
Madjovi rocks.

Mto Sudi from north-eastward.

(*Original dated* 1874.)


Ras Bobare.
Ras Berikiti.
Ras Fughio, bearing 281° distant 3 miles.

Kiswere from northward.

(*Original dated* 1874.)

Chart 681, plan of Lindi harbour.

A light is exhibited from the head of a pier which projects from the shore about a quarter of a mile southward of Ras Nando.

Beacons.—Buoys.—Caution.—Leading beacons are erected on Fungu Mbachiwonaki. The front beacon consists of a tripod, the lower part painted black, the upper part red and white, surmounted by a white slotted disc, and stands on the eastern side of Fungu Mbachiwonaki about 8 cables southward of Ras Nando. The rear beacon, consisting of a tripod, the lower part painted black, the upper part white, surmounted by a white slotted disc, stands on the southern side of the above bank, about 2½ cables south-south-westward of the front beacon. These beacons, when in line with each other, and also with the shoulder of the eastern slope of Mlima Atu, bearing 201°, lead in mid-channel to the anchorage abreast the town.

Four pairs of beacons are charted on the eastern side of the channel between Ras Rungi and the oil pier opposite Lindi.

No. 1 black spar buoy, the fairway buoy, is moored near the line of the leading-light-beacons, about 3 cables northward of Ras Rungi.

No. 3 black conical buoy is moored near the line of the leading-light-beacons, about 4 cables westward of Ras Rungi.

" A " spherical buoy, painted in red and white horizontal bands, is moored near the line of the leading-light-beacons, about 5 cables westward of Ras Rungi.

No. 2 can buoy painted in red and white chequers, is moored near the line of the leading-light-beacons, nearly 6 cables west-south-westward of Ras Rungi (*Lat. 9° 59′ S., Long. 39° 45′ E.*).

No. 5 black conical buoy is moored on the western side of the channel, about 4 cables north-eastward of Ras Nando.

No. 7 black conical buoy is moored on the western side of the channel, about 3½ cables south-eastward of Ras Nando.

No. 9 black conical buoy is moored on the western side of the channel, about 2 cables north-north-eastward of the drying part of Fungu Mbachiwonaki.

The positions of the above buoys should not be relied on, although they are visited periodically by a Government vessel.

Tidal streams.—In Lindi bay, in depths of over 10 fathoms ($18^{m}3$), the tidal streams are not strong, but on the bar and within Mto Lukuledi they attain a velocity of from 2 to 3 knots. The out-going stream at springs commences about half an hour after high water during the dry season. In the rainy season the in-going stream is hardly perceptible and the out-going stream is considerably increased; the latter also begins earlier.

Anchorage.—Temporary anchorage may be obtained outside the bar in a depth of about 5 fathoms ($9^{m}1$), mud, with Ras Rungi bearing about 190°, distant 6 cables, but the best anchorage as regards holding ground, shelter and convenience, for vessels of moderate size, is abreast the town, in a depth of about 9 fathoms ($16^{m}5$), sand and mud, about 4½ cables south-eastward of Ras Nando.

In 1938, H.M.S. *Emerald*, a vessel of 570 feet ($173^{m}7$) in length, moored in mid-channel north-eastward of Ras Nando, in a position with the front leading-light-beacon bearing 262°, distant 8½ cables. Vessels of a similar length should use this anchorage with caution, as the swinging space, although greater than at the anchorage abreast

Charts 1808, 669, 2762, 597, 748b, 2483.

Chart 681, plan of Lindi harbour.

the town, is restricted, and vessels may swing across the river under the influence of wind and tide.

Directions.—Vessels should approach No. 1 buoy with the leading-light-beacons in line, bearing 240°, which line leads in mid-channel across the bar, passing close southward of No. 1 buoy and on reaching No. 3 buoy should alter course to leave " A " buoy close on the port hand; when the beacons on Fungu Mbachiwonaki are in line with each other and also with the shoulder of the eastern slope of Mlima Atu, bearing 201°, course should be altered on to this line, which leads in mid-channel to the anchorage abreast the town.

The Port officer will place a *fixed white* light on No. 1 black spar buoy, if requested by vessels crossing the bar at night.

Piers.—A pier, with a depth of 2½ feet (0^m8) alongside, projects from the shore about 2½ cables southward of Ras Nando (*Lat. 9° 59' S., Long. 39° 44' E.*). There are two cranes on the pier, one of 2 tons and the other of 3 tons lifting capacity.

An oil pier, which is conspicuous and about 200 feet (61^m0) in length, is situated close northward of Ras Rungi. About 7 cables southward of the oil pier, another pier about 1,000 feet (304^m8) in length, projects westward from the shore.

Town.—Lindi is the principal town of the Province of that name, and contains a Custom House and other Government buildings; it is rapidly increasing in importance as a trading centre.

In 1952, the population was about 10,784.

There is a small general hospital at Lindi.

There are three small tugs for towing lighters.

Supplies.—There are no stocks of coal, but a small quantity of fuel oil, in drums, is obtainable.

Limited supplies of fresh provisions may be obtained occasionally, but water is scarce and only sufficient for local needs.

Communications.—There is regular communication by sea with other East African ports.

There is regular air service between Lindi and Europe and South Africa.

Lindi is connected to the general telegraph system.

There is a coastal radio station at Lindi. *See* page 35.

Climatic table.—*See* page 74.

Chart 681, plans of Lindi harbour and Mto Lukuledi.

Mto Lukuledi above Lindi.—Above Fungu Mbachiwonaki the river trends southward and south-westward for about 5 miles, whence it forks into several branches. Mto M'tali, the principal branch, trends south-eastward for about 3 miles, and then south-westward for about 10 miles, where it terminates; it is navigable by boats for this distance. The northern branch is stated to be navigable at half tide by vessels of a draught of 6 feet (1^m8), as far as the village of Nyandi, a few miles above the fork.

Chart 1808.

RAS BANURA TO RAS MIRAMBA.—Coast.—From Ras Banura, *see* page 315, the coast trends northward for about 2 miles to the entrance to Mto Mbanja, which may be identified by a large gap in the coastal hills; there is no anchorage off Mto Mbanja and there are depths of 3 feet (0^m9) within its entrance, but dhows are reported to enter at all states of the tide.

Charts 1808, 669, 2762, 597, 748b, 2483.

Chart 1808.

About 2 miles north-north-westward of the entrance to Mto Mbanja is Ras Kibungwe, a wooded point, 50 feet (15^{m}2) high, and about half a mile farther northward, there is an islet closely resembling it.

Between Ras Kibungwe and Ras Mzinga, the southern entrance point to Mchinga bay, about 7½ miles north-north-westward, the only noticeable feature in the coast is Ras Kera, a bold point, fringed with mangroves, about 4 miles northward of Ras Kibungwe; close southward of Ras Kera, Mto Kera, a small river, enters the sea through a narrow channel between the reefs which fringe the coast, and, although there are depths of 4 fathoms (7^{m}3) in this channel, the surf breaks right across its mouth and renders entry dangerous, even for boats.

Chart 865, plan of Mchinga bay.

Mchinga bay.—Dangers.—Mchinga bay is entered between Ras Mzinga (*Lat. 9° 45′ S., Long. 39° 46′ E.*) and Ras Rokumbi, about 2¾ miles northward; Mto Namgaru enters the sea at the head of the bay but its mouth is blocked by a drying sandbank which is only passable by boats at high water. Mto Namgaru has not been examined, but it is reported to be tidal for some distance and to be navigable by canoes for a 3-day journey.

Mchinga bay may be identified by the gap made by Mto Namgaru and also by the mangrove-covered islets on the reefs which fringe both entrance points. Mchinga town stands in a coconut grove on the north-western shore of the bay, about three-quarters of a mile northward of the entrance to Mto Namgaru, and Mchinga village is situated about the same distance south-eastward of the river's mouth. *See* view on chart 1808.

Both entrance points and the northern and southern shores of the bay are fringed with reefs, the outer edges of which are steep-to and on which there are numerous mangrove-covered islets; Fungu Rokumbi, the reef fringing the northern shore between Ras Rokumbi and Mchinga town, extends as much as 8 cables offshore in places, and Mwamba Mahazamu extends as much as 5 cables offshore for about one mile westward of Ras Mzinga. Fungu Namtamwa, a drying sandbank, fringes the head of the bay between Mchinga town and village, and blocks the entrance to Mto Namgaru (*Lat. 9° 44′ S., Long. 39° 44′ E.*).

Anchorage.—Directions.—A swell sets into Mchinga bay at all seasons, but small vessels may obtain anchorage, partly sheltered from the swell by Mwamba Mahazamu, in a depth of 3 fathoms (5^{m}5), sand, with Ras Rokumbi bearing 031° and Ras Mzinga bearing 120°; north-eastward of this position, there are greater depths but less shelter.

Vessels should approach Mchinga bay with the entrance to Mto Namgaru bearing between 250° and 260° and should sound constantly; when the tall mangroves on the southern shore, about half a mile eastward of Mchinga village, bear about 180°, the depths suddenly decrease from about 50 to 10 fathoms (91^{m}4 to 18^{m}3), after which, vessels should anchor as convenient.

Chart 1808.

Coast.—Between Ras Rokumbi and Ras Maweli, about 13 miles north-north-westward, the coast is fringed with reefs whose outer edges are steep-to and there are no off-lying dangers and no anchorages. Nondo bay, one mile northward, and Ruvu bay, 4½ miles northward,

Charts 669, 2762, 597, 748b, 2483.

Chart 1808.

respectively, of Ras Rokumbi, are indentations in the coast in which the depths close to the fringing reefs are too great to afford anchorage.

About 11 miles north-north-westward of Ras Rokumbi and about 2 miles inland, a sisal factory with a noticeable chimney stands on the seaward slope of a hill.

Mzungu bay is entered between Ras Maweli and Ras Bwamkuro, about 3 miles north-north-westward. Although exposed to northerly and easterly winds, moderate anchorage may be obtained in the southern part of the bay, in a depth of 9 fathoms ($16^{m}5$), sand and coral, with Ras Bwamkuro bearing 331°, and the centre of a village in the south-western corner of the bay, bearing 211°. Mto Bwamkuro flows into the bay about half a mile southward of Ras Bwamkuro, its mouth blocked by a sandbank which dries at low water ; during the rainy season, discoloured water from the river extends one mile seaward of the entrance, and there are heavy overfalls during the rising tide.

Chart 687.

Kiswere harbour.—Aspect.—Dangers.—Kiswere harbour is approached between Ras Bwamkuro and Ras Fughio, about 4¾ miles northward. The harbour is entered between Ras Bobare, about 3½ miles north-westward of Ras Bwamkuro and Ras Berikiti (*Lat. 9° 24′ S., Long. 39° 37′ E.*), about three-quarters of a mile northward. Mto Nanga flows into the north-western corner of the harbour and the village of Mtumbo lies at its eastern entrance point ; Kiswere village is situated at the south-western corner of the harbour. Fair anchorage may be obtained within the harbour, in depths of about 4 fathoms ($7^{m}3$), but deep draught vessels must anchor outside the entrance in depths of about 12 fathoms ($21^{m}9$), where they are more exposed.

The most distinctive features in the approach to Kiswere harbour, are Mlima Mamba, a conical wooded hill, 419 feet ($127^{m}7$) high, situated about 1½ miles within the head of the harbour, and Mlima Ruhaha, a hill about 2 miles northward of Mlima Mamba and about the same height. At a short distance outside the entrance, the hills backing the harbour appear to be moderately high, with a tableland northward, rising from an elevation of 200 feet ($61^{m}0$) to one 300 feet ($91^{m}4$), and, on a closer approach, Pandawi cliff, a square cliff, 69 feet ($21^{m}0$) high, situated westward of the entrance at the head of the harbour, is conspicuous. *See* view facing page **316**, and view on chart 687.

Coral reefs, which dry at half tide, extend one cable northward of Ras Bobare, and 1½ cables southward of Ras Berikiti ; the edge of the latter reefs are steep-to.

A bar, on which there are depths of from 3 to 6 feet ($0^{m}9$ to $1^{m}8$), extends about three-quarters of a mile southward of the entrance to Mto Nanga, its outer edge being about 1¼ miles westward of Ras Berikiti ; a shoal, awash, lies on its eastern part and there is, at times, a nasty sea on the bar.

The whole of the inner part of the harbour is filled with a bank on which the depths are less than 3 fathoms ($5^{m}5$), which extends to within about a mile of the entrance.

Anchorage.—Directions.—Anchorage may be obtained in a depth of 4 fathoms ($7^{m}3$), stiff mud and good holding ground, about half a mile west-north-westward of Ras Bobare, with Mlima Ruhaha

Charts 669, 2762, 597, 748b, 2483.

Chart 687.

seen between the entrance points to Mto Nanga, or a remarkable sand patch, about 5 cables westward of Ras Berikiti, bearing 002°. This is probably the best anchorage in either monsoon, but, as stated above, deep draught vessels must anchor outside the entrance in a more exposed position.

There is anchorage in depths of 4 fathoms ($7^{m}3$), off Mtumbo village on the eastern bank of Mto Nanga, but this anchorage is only available to light draught vessels that can cross the bar at the entrance to the river.

Vessels should approach Kiswere harbour with Pandawi cliff bearing 264°, and, when abreast of Ras Berikiti (*Lat. 9° 24′ S., Long. 39° 37′ E.*), should steer 247° for the anchorage. If entering near the time of low water, breakers will probably be observed on the bank at the head of the harbour and on the reef off Ras Berikiti; the latter may be passed as close as convenient.

Villages.—Kiswere village is situated on the northern bank of Mto Kiswere, a small stream flowing into the south-western corner of the harbour; it can be reached by boat at half tide. Limited supplies of fresh provisions may be obtained at the village.

Mtumbo village is situated on the eastern bank of Mto Nanga, close to its entrance.

Mto Nanga.—This inlet trends north-westward with depths of 3 fathoms ($5^{m}5$) in the fairway for about 4½ miles within its entrance, whence it forks, and becomes shallow.

About 2 miles above the entrance is a branch which trends westward but the depths in it are shoal. The country eastward of the eastern bank is well-wooded and partly cultivated, but that within the western bank is marshy and at high water springs, is inundated for about a mile inside the bank.

Chart 1808.

Coast.—**Current.**—Between Ras Fughio, *see* page 320, and Ras Ngumbe Sukani, about 12 miles northward, the coast is rocky with sandy beaches and is backed by low hills nearly all of the same height; there are numerous mangrove-covered islets situated on the fringing reef, which latter is everywhere steep-to.

Roango bay, a wide indentation in the coast which is entered northward of Ras Mombi, about 6½ miles northward of Ras Fughio, affords no anchorage and is not distinguishable as a bay at a distance of more than 3 miles. A narrow channel in the reef at the head of the bay, in which there are depths of 3 feet ($0^{m}9$), leads to a creek which affords shelter to dhows. The village of Roango is situated close within the head of the bay, but, except at high water, is unapproachable by boats.

Chart 661.

Ras Ngumbe Sukani is the highest point in this vicinity, and may be identified by two islets, 20 feet ($6^{m}1$) high, situated on the reefs about 5 and 7 cables northward, and, when seen during the morning, a white patch appears on the upper part of the point.

Between Ras Ngumbe Sukani (*Lat. 9° 11′ S., Long. 39° 39′ E.*) and Ras Matuso, about 16 miles north-north-westward, the coast is fronted by Songa Manara island and Kilwa island, between which islands and the mainland are the harbours of Sangarungu and Kilwa Kisiwani.

Chart 1808.

Off this part of the coast, the current sets northward continuously

Chart 1808.

and is frequently found setting towards the coast. It is strongest and most regular during the southern monsoon, when it attains a velocity of 4 knots at times.

Chart 661.

Southern side of approach to Sangarungu harbour.—Between Ras Ngumbe Sukani and the southern extreme of Songo Manara island, about 4 miles north-north-westward, the coast consists of a mangrove swamp with several creeks whose entrances are not distinguishable from seaward. A boat channel, which is only available at high water and in calm weather, leads southward of Songa Manara island into Mto Pawi, the south-eastern arm of Sangarungu harbour, but its entrance is overhung with mangroves, and is not distinguishable from seaward. The southern extreme of Songa Manara island may be identified by a distinctive break in one of the projecting cliffs, which, when seen from southward, appears like an island; with a heavy swell, the sea breaks through this cleft with great violence, throwing spray to a considerable height, and giving the appearance of white smoke rising from the land.

Songa Manara island is low and has numerous coconut groves, Ras Kivurugu, its eastern extreme, about 7 miles northward of Ras Ngumbe Sukani, may be identified by a particularly tall clump of coconut palms on it; Ras Sangarungu, its northern extreme, about 4½ miles west-north-westward of Ras Kivurugu, is sandy, crowned with coconut palms and fringed with mangroves.

The seaward coast of Songa Manara island is rocky and indented, and is fringed with reefs which extend nearly one mile eastward of Ras Kivurugu and north-eastward of Ras Sangarungu; several low bushy islets lie on the reef eastward and northward of Ras Kivurugu.

Sangarungu harbour.—Dangers.—Sangarungu harbour is entered between Ras Sangarungu and Ras Mchangamra, the south-eastern extreme of Kilwa island, about 1½ miles north-north-westward; the latter point is fringed with mangroves and the land within it is low and swampy. The harbour is divided into two parts by Sanji-ya-Kati, an island, covered with mangroves with an extensive reef projecting northward of it; the southern portion of the harbour is named Port Nisus and the northern portion, Port Pactolus.

The shores of the harbour are indented by numerous creeks, fringed with mangroves, and large portions of the harbour are encumbered with shoals and reefs. A narrow channel leads into Mto Pawi, the creek at the south-eastern corner of the harbour which separates Songa Manara island from the mainland, and there is communication with Kilwa Kisiwani harbour by boats, at all states of the tide, by Mlango Mugongo, a wide channel westward of Kilwa island.

The water in Sangarungu harbour is thick and muddy, and sunken dangers cannot be seen.

Ras Mchangamra (*Lat. 9° 01′ S., Long. 39° 33′ E.*) is fringed by a drying reef which extends about half a mile offshore and is steep-to.

A drying reef projects nearly one mile northward of Sanji-ya-Kati island, and a sandspit, with depths of 3 fathoms ($5^{m}5$) over it, extends about three-quarters of a mile northward of the reef, leaving only a very narrow channel leading into Port Pactolus between it and the edge of the reef fringing Ras Mchangamra.

Anchorage.—The entrance is about 8 cables wide between the

Charts 669, 2762, 597, 748b, 2483.

Chart 661.

edges of the fringing reefs, the depths are great and the tidal streams strong and the swell sets far into the harbour making it necessary for vessels to proceed some distance within the entrance in order to obtain a sheltered berth.

Good anchorage, although exposed to the swell, may be obtained in Port Pactolus in depths of from 6 to 11 fathoms ($11^{m}0$ to $20^{m}1$), mud, and anchorage may also be obtained in Port Nisus, south-eastward of Sanji-ya-Kati island, in depths of from 4 to 11 fathoms ($7^{m}3$ to $20^{m}1$), mud.

Villages.—There are several villages on Songa Manara island, of which Sanji-ya-Majoma, situated on the eastern shore of Port Nisus, is the principal, and ruins of Portuguese and Shirazi settlements may be seen at the north-western corner of the island. Many of the creeks are used by the natives for local trade, but all produce from the interior finds its way to Kilwa Kisiwani for export.

Chart 661 and plan of Kilwa Kisiwani harbour.

Kilwa Kisiwani harbour.—Aspect.—Kilwa Kisiwani harbour is the outer part of an extensive inlet which is entered between Ras Kipakoni, the north-eastern extreme of Kilwa island, about 3¼ miles northward of Ras Mchangamra, and Ras Matuso, about 2 miles north-eastward. The entrance is deep and vessels of any description may obtain anchorage abreast the village of Kilwa Kisiwani, situated on the north-western part of Kilwa island, about 2 miles within the entrance. About a mile northward of Kilwa Kisiwani village, the inlet is known as Port Beaver and trends north-westward for about 6 miles and affords anchorage for the largest vessels in a spacious area.

At the head of Port Beaver, the inlet trends westward, the depths decrease, and there are several islands; Mto Mavudyi flows into the head of the inlet with depths of 2½ fathoms ($4^{m}6$) at its mouth and is said to be navigable for some distance by canoes.

Chart 661.

Mpara hill, 460 feet ($140^{m}2$) high, on the northern shore of Port Beaver, about 8 miles north-westward of Ras Kipakoni, is the only hill in the immediate vicinity, and should be seen in clear weather from a distance of 20 miles by vessels from northward or southward. It is flat-topped and in no way remarkable, except that the nearest hill to it, Singino hill, 550 feet ($167^{m}6$) high, lies about 5 miles northward. Although there are other hills southward of Songa Manara island which are somewhat similar in appearance, the latter are continuous, whereas, southward of Mpara hill is a low plain extending for 20 miles. *See* view on chart 662.

In very clear weather, the Mchinga range, 1,200 feet ($365^{m}8$) high, and 20 miles inland, will be seen, but their summits are not well marked. Ras Matuso is moderately prominent either from northward or southward, and Mwamba Rukyira, the reef extending eastward of it, will be seen from a distance of 3 miles either dry or breaking. In 1918, two trees on the eastern side of Mwamba Rukyira were reported to be visible at a distance of 8 or 10 miles, and to form a useful mark to vessels approaching from northward.

In the morning, the old Arab castle, a tall keep-like tower, standing at the north-western extreme of Kilwa island, about 2 miles westward of Ras Kipakoni (*Lat. 8° 57′ S., Long. 39° 32′ E.*), is noticeable, and

Charts 1808, 669, 2762, 597, 748b, 2483.

Chart 661.

may be seen at a distance of about 10 miles, as may also a baobab tree, which, in 1913, stood about half a mile eastward of it.

The yellow cliffs at the south-western corner of Mso bay, about 1½ miles north-westward of Ras Kipakoni, are said to be visible at a distance of 7 miles.

Approaches to Kilwa Kisiwani harbour.—Dangers.—On the southern side of the approach to Kilwa Kisiwani harbour, the eastern coast of Kilwa island is fringed by a drying reef which extends as much as one mile offshore in places; its seaward edge is steep-to. The southern part of Kilwa island is swampy and covered with jungle, but the northern part is a coral plateau, 50 feet ($15^{m}2$) high, on which there are numerous large baobab trees.

On the northern side of the approach to Kilwa Kisiwani harbour, Mwamba Rukyira, a large tongue of reef, extends eastward of Ras Matuso for about 3¼ miles, whence it trends northward for about 2½ miles and terminates in Rukyira spit, the northern extreme of which lies about 4 miles north-eastward of Ras Matuso; the outer edge of this reef is very steep and the sea always breaks on it.

Mwamba Rukyira is completely dry at low water springs, and there are several small mangrove bushes and sandbanks on its eastern part. In 1918, it was reported that two small sandy islets, close together, with two trees on them, were situated near the eastern edge of the reef, about 1¾ miles southward of the northern extreme of Rukyira spit. A conspicuous mangrove bush is situated about 3 cables south-westward of the two islets.

Rukyira bar, which extends northward of Rukyira spit, is described on page 327.

Chart 661, plan of Kilwa Kisiwani harbour.

Dangers in Kilwa Kisiwani harbour.—Beacons.—Buoy.—Ras Kipakoni is low and its western part is fringed with mangroves. Mwamba Kipakoni, the north-eastern part of the drying reef which fringes the eastern coast of Kilwa island, extends about three-quarters of a mile east-north-eastward of Ras Kipakoni and terminates at Balozi spit, which projects about 6 cables northward of that point; this spit is sheltered by Mwamba Kipakoni and the sea only breaks on it near low water.

A beacon, surmounted by a cylinder, the upper half of which is painted white and the lower half black, marks the northern extreme of Balozi spit.

Ras Matuso is low, sandy and has a few scattered trees, Ras Mso, about 1¾ miles westward, is a low cliff about 10 feet ($3^{m}0$) high, and the intervening coast is alternately sandy and low cliffs. Between Ras Mso and Ras Rongozi, about 1¼ miles south-westward, is Mso bay, in which the depths are less than 5 fathoms ($9^{m}1$), and which has a sandy beach at its head.

Leading beacons are erected at the south-western corner of Mso bay. The front beacon is a white rectangular post with a conical top, situated on the coast about 7 cables west-south-westward of Ras Mso. The rear beacon is a black wooden diamond, mounted on the trunk of a tree, nearly 2 cables west-north-westward of the front beacon. These beacons, when in line bearing 285°, lead in mid-channel between Mwamba Kipakoni and Mwamba Rukyira.

Between Ras Kipakoni and Ras Ruvura (*Lat. 8° 57′ S., Long.*

Charts 1808, 669, 2762, 597, 748b, 2483.

Chart 661, plan of Kilwa Kisiwani harbour.

39° 30′ E.), about 2½ miles westward, the southern shore of the harbour consists of a low cliff, fringed with a narrow belt of mangroves which extend also along the western edge of Balozi spit; the reef fringing the coast is steep-to, and near its north-western extreme is Castle islet, which is thickly covered with mangroves.

About half a mile eastward of Kilwa Kisiwani village and in an open space, is a baobab tree, 45 feet ($13^{m}7$) in height, which, in 1913, was painted black and white, but it was difficult to distinguish in certain lights. A prominent yellow patch is situated about half a cable north-westward of the tree.

Between Kilwa Kisiwani village and Ras Ruvura are the extensive ruins of old Quiloa, of which the most noticeable feature is the Arab castle standing on the edge of the coast.

About three-quarters of a mile west-south-westward of Ras Mso, the sandy beach terminates abruptly in low, rocky cliffs, showing in one part a yellow face; southward of these cliffs, the coast is thickly fringed with mangroves which extend around the peninsula whose southern extreme is Ras Rongozi, as far as the entrance to Port Beaver.

A drying bank of sand and mud extends about 2¼ cables south-westward of Ras Rongozi, and a rock, with less than 6 feet ($1^{m}8$) over it, lies near the outer edge of this bank, off which there are tidal eddies.

A black conical buoy is moored about 2½ cables southward of Ras Rongozi.

Tidal streams.—The tidal streams are strong and there is often an eddy at the anchorage within the harbour, but as the holding ground is stiff mud, vessels may safely ride at anchor with a short scope of cable, and the anchor thus be kept clear.

Anchorage.—During the north-east monsoon, temporary anchorage may be obtained outside the harbour in about 10 fathoms ($18^{m}3$), sand, about 9 cables southward of Ras Matuso and 2 cables from the edge of Mwamba Rukyira. The farther eastward at this anchorage, the less are the tidal streams felt.

Anchorage, open to the sea breeze but completely sheltered from the ocean swell, may be obtained about half a mile northward of Kilwa Kisiwani village, in depths of from 9 to 15 fathoms ($16^{m}5$ to $27^{m}4$). A good berth is in a depth of 12 fathoms ($21^{m}9$), with Castle islet bearing 241°, the Arab castle bearing 201°, and Ras Kipakoni (*Lat. 8° 57′ S., Long. 39° 32′ E.*) bearing 090°; this berth is about 2 cables from the edge of the reef abreast Kilwa Kisiwani village.

Directions.—**Caution.**—Allowance must be made for the tidal streams, and no reliance should be placed on positions obtained by bearings of points formed by mangrove bushes, as the growth of the latter may have considerably altered the point.

At low water, the eye is sufficient guide for entering the harbour, but at high water the sea only breaks over the outer dangers, and Balozi spit is not even marked by ripples although the beacon on its northern extreme indicates its position. Unless with local knowledge, vessels should avoid entering with the strength of the in-going tidal stream, and with the sun ahead; during the period of the out-going tidal stream, there are at times, heavy overfalls between the outer points of the reefs, which, at springs, are dangerous for boats, *Chart 661, plan of Kilwa Kisiwani harbour.*

but there are depths of over 30 fathoms ($54^{m}9$) in the channel where the overfalls take place.

Vessels from southward should approach with Ras Matuso bearing about 296°, and when the leading beacons, situated close southward of Mso bay, are in line, bearing 285°, they should be steered for on that bearing, which leads through mid-channel passing northward of Balozi Spit beacon ; after passing the latter beacon, course should be altered gradually south-westward, and the large, spreading baobab tree should be steered for, bearing 227°, until abreast of the bank extending southward of Ras Rongozi, when course may be shaped for the selected anchorage.

Chart 661.

Vessels from northward may run along the south-eastern edge of Mwamba Rukyira, keeping about half a mile from the edge of the reef, until the yellow cliffs at the south-western corner of Mso bay bear 285°, when the above directions should be followed.

Easterly winds generally cause a considerable swell outside the harbour.

Chart 661, plan of Kilwa Kisiwani harbour.

Village.—Piers.—Kilwa Kisiwani village occupies the site of the old Portuguese town of Quiloa ; it has a large native population, but no Europeans are resident. The harbour is bordered by mangroves and the locality has a bad reputation for malaria, but it is no worse than Kilwa Kivinje, and were the sites of the houses better chosen, it would be more healthy.

Fresh provisions are fairly plentiful and excellent net fishing may be obtained in the harbour.

Three piers are situated at Kikone, on the western side of the peninsula, of which the southern extreme is Ras Rongozi (*Lat. 8° 57′ S., Long. 39° 31′ E.*) ; the northern pier has a depth of 4 feet ($1^{m}2$) at its extreme, and is known as the deep water pier. In 1935, it was reported that these piers were derelict.

Chart 661.

Coast.—Dangers.—Rukyira bar.—Between Ras Matuso, *see* page 324, and Ras Tikwiri or Kilwa point, about 7½ miles north-north-westward, the coast is flat and sandy and there are several villages, the land within being covered with dense jungle. A drying reef, the continuation of the northern side of Mwamba Rukyira, fronts this coast and extends between half a mile and 1¼ miles offshore.

Ruangale, a detached reef which dries 7 feet ($2^{m}1$), on which the sea always breaks, lies with its outer edge about 2½ miles east-south-eastward of Ras Tikwiri.

There is anchorage in the bight northward of Mwamba Rukyira, known as Rukyira bay, which is sheltered from the swell by Rukyira spit, but this anchorage is not recommended, as it is approached over Rukyira bar, which is described below.

Chart 1032.

Between Ras Tikwiri and Ras Miramba, a low mangrove point, about 6 miles north-westward, the coast is bordered by a thin belt of mangroves and is fronted by a drying bank of sand and mud, which extends as much as three-quarters of a mile offshore.

Mpovi, a detached reef which dries from 4 to 11 feet ($1^{m}2$ to $3^{m}4$), the outer edge of which lies about 4 miles east-south-eastward of Ras

Charts 1808, 662, 669, 597, 748b, 2483.

Chart 1032.

Miramba, is steep-to on its eastern side, near which are a few mangrove bushes ; on its western side, it is connected to the coast by a bank on which the depths are 2 fathoms (3^{m}7), and depths of one fathom (1^{m}8), extend about 1½ miles northward of Mpovi.

Charts 661, 1032.

Rukyira bar is a chain of shoals, with depths of from 3 fathoms (5^{m}5) to less than one fathom (1^{m}8) over them, which extends northward for about 9 miles from Rukyira spit to within a mile of the reefs on the southern side of Kilwa Main pass. The depths on Rukyira bar are very irregular, and although there are probably channels across it, through which vessels can at all times enter Rukyira bay, the attempt should not be made without good cause, as there is usually a heavy swell, and it is possible that other shoals, in addition to those charted, may exist.

Chart 1032.

KILWA KIVINJE AND APPROACHES.—Kilwa Main pass. —Beacons.—Light.—Kilwa Kivinje town (*Lat. 8° 45′ S., Long. 39° 25′ E.*) is situated on the shores of a bay about one mile westward of Ras Miramba ; anchorage may be obtained northward of the town, but although the anchorage is sheltered by reefs, there is a slight swell when the monsoon is strong. The anchorage is approached from seaward through Kilwa Main pass, a deep channel through a break in the reefs which front the coast from Ras Miramba for about 30 miles northward. The anchorage may also be approached from northward by a channel passing between the outer and inner chain of these reefs, and which is described on pages 330–333.

Singino hill, 550 feet (167^{m}6) high, lies about 1½ miles southward of Kilwa Kivinje town ; it is a flat, cultivated plateau, with a moderately steep edge on all sides. On its western side, it is connected by a low spur to a small conical hill named Nunguruku, and there are other small hills extending westward, but the country generally in this latter direction, is flat and without distinctive features. *See* view on chart 1032.

The station house, a white stone building with a high red roof resembling a tower, and a large white house, are prominent landmarks on the beach in front of Kilwa Kivinje town.

Mto Gingwera enters the sea about 3½ miles west-north-westward of Ras Miramba, but its entrance is difficult to identify, even when close to the anchorage. The bar of Mto Gingwera dries, but the river is navigable by boats for about 9 miles.

Mwanamkaya is a reef which forms the southern entrance point to Kilwa Main pass. It lies with its eastern edge about 5 miles east-north-eastward of Ras Miramba, its southern end being about one mile westward of the shoals forming the northern extreme of Rukyira bar. The main part of the reef dries from 2 to 4 feet (0^{m}6 to 1^{m}2), and on its south-western side is a sandbank which dries 13 feet (4^{m}0).

Amana is a reef which lies about 1¾ miles westward of Mwanamkaya, its northern edge being about 3 miles north-eastward of Ras Miramba ; a sandbank which dries 7 feet (2^{m}1), lies on its western end. There is a clear passage round Amana with a least depth of 4 fathoms (7^{m}3).

A beacon, consisting of an iron tripod, surmounted by a daymark, stands on the northern edge of Amana.

Charts 1808, 662, 669, 2762, 597, 748b, 2483.

Chart 1032.

Fanjove island (*Lat. 8° 34′ S., Long. 39° 34′ E.*), about 13 miles north-eastward of Ras Miramba, is covered with trees, and stands on the north-western end of an extensive reef, the southern extreme of which lies about 3¾ miles southward of the island and forms the northern entrance point to Kilwa Main pass. The outer edge of this reef dries 4 feet ($1^{m}2$), is steep-to, and the sea always breaks on it. A bank, on which there are depths of 3 and 5 fathoms ($5^{m}5$ and $9^{m}1$), extends about one mile west-south-westward of the southern extreme of the reef.

A light is exhibited, at an elevation of 65 feet ($19^{m}8$), from a white, quadrangular tower, 55 feet ($16^{m}8$) in height, with dwelling attached, situated on the southern extreme of Fanjove island. *See* view on chart 1032.

Luala is a reef situated about 4 miles south-westward of Fanjove Island lighthouse and has on its north-western side a sandbank which dries 6 feet ($1^{m}8$).

Jewe is a reef lying about 7½ miles west-south-westward of Fanjove Island lighthouse ; there is a long narrow strip of sand near its north-western edge, which dries 11 feet ($3^{m}4$).

A beacon, consisting of an iron tripod, surmounted by a white St. George's cross, stands on Jewe near the western end of the narrow sand strip. A small patch of reef was reported, in 1950, to exist about 1¾ miles north-north-eastward of the beacon on Jewe.

Dangers in Kilwa Kivinje roadstead.—Buoy.—Tidal streams. —A bank of sand and mud, on which the depths are less than 3 fathoms ($5^{m}5$), extends offshore as much as 1½ miles in places between Ras Miramba and the entrance to Mto Gingwera ; in 1910 this bank was reported to be extending seaward.

Two rocks, each with a depth of less than 6 feet ($1^{m}8$) over them, are situated about 2¼ miles eastward of the entrance to Mto Gingwera.

A black conical buoy is moored close within the edge of the 3-fathom ($5^{m}5$) bank, about one mile north-north-westward of Ras Miramba.

The tidal streams are inappreciable at the roadstead.

Anchorage.—Directions.—A good anchorage berth is in about 4½ fathoms ($8^{m}2$), with the station house bearing 198°, and Nunguruku hill bearing about 224°.

Vessels approaching Kilwa Main pass from seaward should sight Fanjove island, and the larger island of Songo Songo, about 3½ miles north-westward of it, at a considerable distance. Southward of the pass, Singino and Mpara hills should also be seen from some distance, but no land will be visible southward of the latter hill, unless in very clear weather, when the Mchinga hills may be seen.

Vessels should steer to pass about 5 miles southward of Fanjove island, and when the breakers on the reef extending southward of that island, are seen, the eye will be the best guide, but the bank extending west-south-westward of the southern extreme of the reef surrounding Fanjove island, should be given a berth of at least half a mile.

Proceeding westward between the reefs of Amana and Jewe, the position should be fixed by bearings of the beacons on those reefs and of Fanjove Island lighthouse, and Singino and Nunguruku hills may also be found useful. When approaching the anchorage, vessels should keep in depths of more than 5 fathoms ($9^{m}1$).

Charts 1808, 662, 669, 2762, 597, 748b, 2483.

Chart 1032.

For directions for the inner channel, *see* pages 344–345.

Town.—The town of Kilwa Kivinje (*Lat. 8° 45′ S., Long. 39° 25′ E.*) consists of a mass of huts and brick buildings and is surrounded by coconut palms. A District Commissioner is resident.

In 1951, the population was about 3,000.

Fresh provisions, with the exception of vegetables, are plentiful.

Communications.—The town is connected to the general telegraphic system.

Climatic table.—*See* page 75.

MTO GINGWERA TO RAS POMBWE AND OFF-LYING ISLANDS AND REEFS.—Inner channel.—Between the entrance to Mto Gingwera, and Ras Pombwe, about 25 miles northward, the coast is fronted by a mass of islands and reefs which extend as much as 18 miles offshore in places. With the exception of Nyuni pass, which is entered about 8 miles northward of Fanjove island, the outer islands and reefs are more or less continuous between Kilwa Main pass and South Mafia channel, about 23 miles northward, but there is a deep navigable channel between the inner reefs, the southern end of which, terminates at the head of Kilwa Main pass.

North-bound vessels will gain nothing by using the inner channel, as the current outside the outer reefs is favourable to them, but for south-bound vessels of moderate draught and low power, the inner channel may be of considerable advantage. The track recommended is marked by a pecked line on the chart ; it is best navigated by vessels when the sun is in a favourable position for seeing the reefs and with a good lookout aloft. For directions for using the inner channel, *see* pages 344–345.

Coast.—Dangers.—Between the entrance to Mto Gingwera, described on page 327, and Ras Ndumbo, about 21 miles northward, the coast is backed by a flat plain, the north-western portion of which, gradually rises to a number of low, wooded ridges lying parallel with the coast, within which ridges, the land rises to an elevation of from 1,700 to 2,200 feet (518^{m}2 to 670^{m}6), at the Matumbi range, about 17 miles inland.

Kitope hill, a thickly wooded, flat-topped hill, 780 feet (237^{m}7) high, rising from the plain about 8 miles west-north-westward of Ras Ndumbo, is prominent, and, northward of its summit, is a lower spur with a small conical top.

For about 7 miles northward of the entrance to Mto Gingwera, the coast consists of a sandy beach, but farther northward it is fringed with mangroves, and Ras Wango, about 10 miles northward of Mto Gingwera entrance, and Ras Samanga Fungu, about 8 miles farther northward, are both covered with mangroves ; the high mangroves on the latter point are noticeable when seen from northward and close inshore.

There are several villages along this coast but they are mostly concealed by mangroves, as is Samanga, which is the largest village between Kilwa Kivinje and Ras Pombwe, and is situated on the northern side of a creek between Ras Samanga Fungu and Ras Ndumbo (*Lat. 8° 22′ S., Long. 39° 18′ E.*) ; there are said to be numerous communicating creeks between the two latter points.

A drying bank of sand and mud extends offshore between Mto

Chart 1032.

Gingwera entrance and Ras Ndumbo, but there are no fringing reefs, except off Ras Wango, where Fungu Wango, which dries 6 feet ($1^{m}8$), extends 2¼ miles eastward of Ras Wango ; Fungu Kiswasi, a detached reef, which dries 6 feet ($1^{m}8$), lies about 2 miles north-eastward of Ras Wango, and Afisi, a reef which dries 4 feet ($1^{m}2$), lies about 2 miles east-south-eastward of Ras Ndumbo.

Between Ras Ndumbo and Ras Pombwe, a mangrove-covered point, about 5 miles northward, is Mohoro bay, at the head of which is the mangrove-covered delta of Mto Mohoro. The village of Marendego is situated on the banks of Kikwaju creek at the north-western corner of the bay, but the head of the bay is fronted by drying banks which extend as much as 2½ miles offshore.

Okambara, a reef composed of coral and sand, extends about 4½ miles east-south-eastward of Ras Pombwe ; it dries 8 feet ($2^{m}4$) in places, and is connected to Ras Pombwe by a drying sandbank.

Mwamba Mkuu, a detached reef, which also dries 8 feet ($2^{m}4$) in places, is situated about 5 miles eastward of Ras Pombwe.

Mto Mohoro.—Mto Mohoro enters the sea through two mouths at the head of Mohoro bay ; Ras Pombwe forms the eastern entrance point to the Utagite mouth, the principle one, and the Lokotonazi mouth lies about 2 miles westward. There are depths of from one to 3 fathoms ($1^{m}8$ to $5^{m}5$) in the two mouths which are connected by a creek which is entered about one mile north-westward of Ras Pombwe.

There is an outer bar and an inner bar across the Utagite mouth, the former being situated about 2¼ miles southward of Ras Pombwe ; in 1917, there was a least depth of 3 feet ($0^{m}9$) on the outer bar. There is no swell on the bar, but, with any wind, the sea breaks on the sandbanks on either side at half tide ; the channel into the river is narrow and the bars are said to shift.

In January 1917, a vessel with a length of 169 feet ($51^{m}5$) and draught of 9 feet ($2^{m}7$), and another vessel of a draught of 11½ feet ($3^{m}5$), were successfully navigated several times as far as Bongwe, a small village about 9 miles within the outer bar. The latter was generally crossed one hour before high water, enabling the in-going tidal stream to be carried as far as Bongwe, at which place high water occurs one hour after high water at the outer bar, the rise being about 11 feet ($3^{m}4$).

At Bongwe, the river is 200 yards ($182^{m}9$) wide, but it narrows considerably higher up, and above Ndunde, a village about 2½ miles north-westward of Bongwe, the river is difficult to navigate, and, during January, is only available to small craft at high water ; the estimated rise of the tide during that month at Mohoro (*Lat. 8° 08′ S., Long. 39° 11′ E.*), a village about 5 miles north-westward of Ndunde, being about 6 feet ($1^{m}8$).

During floods, the river rises several feet, the current attaining a velocity of about 4 knots, and the in-going tidal stream is then not felt above Bongwe.

The river banks are low and covered with mangroves as far as Ndunde, whence they become steep and the country on either side of the river as far as Mohoro, is cultivated.

Islands and reefs between Kilwa Main pass and Nyuni pass.—Anchorage.—Fanjove island and the reefs of Luala and Jewe,

Charts 662, 669, 2762, 597, 748b, 2483.

Chart 1032.

which form the northern side of Kilwa Main pass, are described on page 328.

Songo Songo is a coral island covered with trees, lying about 3½ miles north-westward of Fanjove island; it stands on a broad drying reef, off which there are many sunken rocks. Pumbavu, a sandy islet with a few trees on it, stands on the north-western extreme of the reef surrounding Songo Songo, and is connected to the latter by a ridge of sand, which dries 8 feet (2^m4). A clump of trees on the north-western end of Songo Songo is noticeable when seen from the inner channel. There is a village on the eastern side of the island, about half a mile inland, and there are wells with moderately good water nearly in the centre of the island, but the latter are difficult of access and are best approached from the western side. Cattle and goats are bred on the island.

Pweza is a reef which lies about 2½ miles southward of the southern extreme of Songo Songo; there is a small sandbank on it which dries 8 feet (2^m4).

Val rock, with less than 6 feet (1^m8) over it, lies on the eastern side of the inner channel, about 2 miles south-westward of Songo Songo; this rock does not break and it should be given a wide berth.

The reefs of Pwajuu and Poiasi lie in the fairway of the inner channel, about 3½ miles west-south-westward, and about the same distance westward, respectively, of Songo Songo. Both of these reefs are steep-to and have long, narrow ridges of sand on them; the bank on Pwajuu dries 8 feet (2^m4), and that on Poiasi, dries 11 feet (3^m4) at its north-western end.

Sanders rock, with 1¼ fathoms (2^m3) over it, lies about 1½ miles northward of the northern extreme of Songo Songo.

Imbi is a reef situated about 4½ miles north-eastward of Songo Songo, and has on it a sandbank which dries 7 feet (2^m1); a 3-fathom (5^m5) bank extends about 3 miles southward of Imbi, leaving only a narrow 4-fathom (7^m3) channel between its extreme and the reef surrounding Fanjove island (*Lat. 8° 34′ S., Long. 39° 34′ E.*); this channel has only been partly examined. A 2-fathom (3^m7) bank extends about 3 miles westward of Imbi and on its western end is Msuaji, a reef which dries one foot (0^m3).

Baniani, a reef which dries 10 feet (3^m0), lies about 3 miles northward of the northern extreme of Songo Songo.

Anchorage may be obtained in a depth of about 6 fathoms (11^m0), from 3 to 5 cables westward of Pumbavu. Small craft may obtain more sheltered anchorage in depths of about 4 fathoms (7^m3), in a pocket between Songo Songo and the reefs which extend southward of Pumbavu, which is approached over a sandbank with a least depth of 2 fathoms (3^m7), close southward of the islet. During the south-west monsoon, vessels of moderate draught may obtain sheltered anchorage off the north-eastern side of Songo Songo, in depths of about 7 fathoms (12^m8), with the northern extreme of the island bearing 285°, and the southern extreme, bearing 202°.

Nyuni pass.—Nyuni pass is entered between Imbi and a reef which surrounds the islet of Nyuni, about 3 miles northward, and affords access to the inner channel; there is generally a heavy swell in the pass, and as no good leading marks can be given, the passage is not recommended.

Charts 662, 669, 597, 748b, 2483.

Chart 1032.

There are depths of over 100 fathoms ($182^{m}9$) at the entrance, but the depths decrease very rapidly close within it, and there are 3-fathom ($5^{m}5$) patches on the northern side of the pass, about 2 miles northward of Imbi, and a 3-fathom ($5^{m}5$) shoal in the centre of the pass, about 2¾ miles north-westward of Imbi.

Islands and reefs between Nyuni pass and South Mafia channel.—Beacons.—Anchorage.—Machangi is a group of reefs lying about 5 miles north-north-westward of Songo Songo at the head of Nyuni pass and on the eastern side of the inner channel. The south-western reef is steep-to and dries at half tide but it does not show up well; near the western edge of the north-western reef is a sandbank, which dries 10 feet ($3^{m}0$), and which, except when covered, is a good mark for indicating the inner channel.

Banda is a reef lying on the eastern side of the inner channel north-eastward of the reefs of Machangi, and about 7½ miles north-north-westward of Songo Songo, and has a sandbank on it, which dries 8 feet ($2^{m}4$); its western side is not steep-to.

Chocha is a reef which lies on the western side of the inner channel, about 6½ miles east-south-eastward of Ras Ndumbo (*Lat. 8° 22′ S., Long. 39° 18′ E.*) and has, on its north-western extreme, a sandbank which dries 9 feet ($2^{m}7$); a shoal spit, which is generally indicated by the green colour of the water over it, extends about 2 cables off its south-eastern extreme.

A beacon, consisting of an iron tripod, surmounted by a black sphere, marks the south-eastern extreme of Chocha.

A detached reef, which dries, lies about one mile southward of Chocha.

Membeuso, a reef which lies on the western side of the inner channel, about 7 miles eastward of Ras Ndumbo, is steep-to, and has a sandbank on it which dries 8 feet ($2^{m}4$); a detached patch of reef, which dries, lies half a mile southward of Membeuso.

A black tripodial beacon, surmounted by a white spherical daymark, marks the eastern edge of Membeuso.

Miza is a group of reefs lying about 4½ miles eastward of Ras Ndumbo, one of which dries 3 feet ($0^{m}9$); about half a mile eastward of Miza, there is a rock awash.

Nyuni, an islet composed of coral and sand, and covered with bushes with a few casuarina trees, lies about 9 miles north-north-eastward of the northern extreme of Songo Songo; it stands on the western edge of a drying reef of which the seaward face is very steep-to.

Kimbore, a reef which dries 9 feet ($2^{m}7$) in places, lies about one mile westward of Nyuni.

Bawara is a group of several small reefs which lie on the eastern side of the inner channel between 2½ and 5½ miles north-westward of Nyuni. The western edges of these reefs are moderately steep-to.

Simaya is a sandy islet, covered with high trees which are visible at a considerable distance, situated on the western side of the inner channel, about 6 miles eastward of Ras Pombwe, and one mile eastward of the south-eastern extreme of Mwamba Mkuu, *see* page 330; there is a least depth of 6 fathoms ($11^{m}0$) in the channel between Mwamba Mkuu and Simaya. Simaya stands on a drying reef which extends as much as three-quarters of a mile south-eastward, and is steep-to.

Mombawaka, a reef awash in places, lies about 3 miles north-north-

Charts 662, 669, 2762, 597, 748b, 2483.

Chart 1032.

eastward of the islet of Nyuni; the sea generally breaks over the whole of this reef.

Okuza, a sandy island, covered with casuarina trees, is situated about 6 miles northward of the islet of Nyuni; the highest trees are at the eastern side of the island and are visible from a considerable distance. The island stands on an extensive reef which forms the southern entrance point to South Mafia channel; the reef dries 10 or 12 feet ($3^{m}0$ or $3^{m}7$) in places, and is steep-to, especially on its seaward side.

A 3-fathom ($5^{m}5$) patch lies about 2½ miles south-south-westward of the western extreme of Okuza island.

Anchorage may be obtained westward of the reef surrounding Okuza, in depths of from 7 to 12 fathoms ($12^{m}8$ to $21^{m}9$). During the north-east monsoon, vessels should anchor westward of the southern part of the reef, in order to avoid the swell.

RAS POMBWE TO KIKUNYA MOUTH, INCLUDING MTO RUFIJI AND DELTA.—Coast.—Between Ras Pombwe (*Lat. 8° 17′ S., Long. 39° 20′ E.*) and Kikunguni village, situated at the north-western entrance point to Kikunya mouth, about 36 miles northward, the coast is a maze of low, swampy, mangrove-covered islands, intersected by creeks, comprising the delta of Mto Rufiji. Some of these creeks do not communicate with either Mto Rufiji or Mto Mohoro, and these two rivers never join at ordinary times, but, during the rainy season in the interior, December to February, the whole of the delta is frequently inundated.

The coast of the delta projects eastward of the general coastline, and is about 50 miles in length, low, and of uniform outline when seen from seaward; in nearly all places it is fringed with mangroves which extend inland for varying distances. Ras Twana, the north-eastern extreme of the delta, about 30 miles north-north-eastward of Ras Pombwe, is low, mangrove-covered and fronted by a drying bank of mud and sand which extends about 3½ miles eastward; the outer edge of this bank is moderately steep-to and it is generally only visible when the sea is breaking on it.

Within the swampy mangrove belt there is a broad flat plain, about 35 miles in length, covered with long grass and with a few trees and scattered villages, near which latter, the land is cultivated.

The coast of the delta is broken by ten large mouths, eight of which are connected at all times with Mto Rufiji, the other two being salt-water creeks. All these mouths are connected by a series of small creeks close within the coast, which, at high water, serve as canoe channels between the villages without the necessity of crossing the bars. The two northern mouths, the Kikunya and the Simba Uranga mouths, have not got bars across them, and are consequently the best entrances to the river.

The northern part of the delta is fronted by the island of Mafia and the numerous islets and reefs which lie in the intervening channel For description of the island of Mafia and Mafia channel, *see* pages 337 and 341.

Yaya mouth.—Off-lying dangers.—This mouth, which is entered about 5 miles northward of Ras Pombwe, is the entrance to Mto Rufiji-ya-Wake or Kiengieni, which river is connected to Mto Rufiji, but its upper part is too shoal even for boats in the dry season.

Charts 662, 669, 597, 748b, 2483.

Chart 1032.

The village of Yaya stands in a clump of high trees on the northern entrance point ; within the entrance, on the southern bank, the Maringo branch leads into the Utagite mouth of Mto Mohoro, and, on the northern bank, the Simbandona and the Kiongoroni branches lead into the Ngedu mouth.

There is a bar situated about 1½ miles eastward of the Yaya mouth ; it is never quite dry but there is usually a swell on it. Several shoals awash, with depths of from 5 to 7 fathoms ($9^{m}1$ to $12^{m}8$) close-to, are situated between 2½ and 4½ miles eastward of the entrance.

Ngedu mouth.—This mouth is situated about 4 miles northward of the Yaya mouth, but it is of no importance to shipping.

Ndahi mouth.—The Ndahi mouth, situated about 4 miles northward of the Ngedu mouth, had, in 1874, on its northern entrance point, a grove of high casuarina trees, which may assist in its identification. The entrance is exposed to the ocean swell which sets in through South Mafia channel, causing a heavy sea on the bar at all times. The Ndahi mouth is connected to the Ngedu mouth by the Uginga arm ; about 2½ miles within the entrance, the Ndahi mouth becomes Mto Usimbe, which joins Mto Rufiji near the village of Usimbe (*Lat. 8° 01′ S., Long. 39° 18′ E.*). During the dry season, Mto Usimbe is only navigable by boats at spring tides.

Kiassi mouth.—This mouth, which is entered about 5½ miles northward of the Ndahi mouth, joins the latter mouth at its confluence with Mto Usimbe. The Kiassi mouth and the Msala mouth about 6 miles northward, are both approached through the Msala channel, *see* page 342.

Msala mouth.—The Msala mouth may be considered to be the true mouth of Mto Rufiji as although the entrance is small, firm ground and fresh water are reached much sooner through it than through the larger mangrove-bordered creeks. The entrance is fronted by drying banks of sand and mud, which extend about 3 miles offshore, and, at low water, springs, entrance is impracticable ; with a fresh breeze, there is a considerable swell on the bar.

Close within the Msala mouth there is a large creek leading southward, on the shore of which stands Msala village ; there is a rangers' house in the village.

In the main channel of the Msala mouth, which is known as the Bumba branch, the mangroves cease about 5 miles within the entrance, and for about 7 miles the country is dense forest, which gives place to open country at the junction of the Bumba branch with Mto Rufiji. The average breadth of the Bumba branch is from 240 to 450 feet ($73^{m}2$ to $137^{m}2$), and the depths, about one to two fathoms ($1^{m}8$ to $3^{m}7$).

Twana creek is entered close within the northern entrance point to the Msala mouth and leads to the coast close westward of Ras Twana, about 5½ miles northward.

Kiomboni mouth.—This mouth, situated about 2 miles west-north-westward of Ras Twana, is one of the larger mouths of Mto Rufiji, and for about 12 miles within the entrance, it flows through dense mangroves with a width of about 2 cables and depths of from 3 feet to 3 fathoms ($0^{m}9$ to $5^{m}5$). Close above this point, it is joined by the Simba Uranga branch, and the two branches together join Mto Rufiji about half a mile above their confluence.

Simba Uranga mouth.—Directions.—The Simba Uranga mouth

Charts 662, 669, 597, 748b, 2483.

is entered about 5½ miles west-north-westward of Ras Twana (*Lat. 7° 49′ S., Long. 39° 27′ E.*), and is used by coasting vessels engaged in the timber trade. There is no defined bar at the entrance, but a bank, on which the depths are less than 3 fathoms ($5^{m}5$), extends 6 or 7 miles offshore, the depths on this bank decreasing towards the entrance, and there are several mudbanks, which nearly dry, situated between 2 and 4 miles north-eastward of the eastern entrance point; near low water, a considerable sea is at times raised on the bank by the out-going tidal stream. In 1916, there was a least depth of 8 feet ($2^{m}4$) in the channel across the bank leading to the entrance; the depths, however, probably vary from year to year.

Within the entrance, the Simba Uranga mouth runs generally south-westward for about 10 miles and has numerous branches south-eastward leading to the Suninga arm, and north-westward, leading to the Kikunya arm. Except close within the entrance, where there are depths of about 7½ fathoms ($13^{m}7$) for a short distance, the Simba Uranga arm is shallow, and although between 1½ and 2 cables in width, the depths are only from 1½ to 7 feet ($0^{m}5$ to $2^{m}1$).

The Suninga arm, which forms the principal approach to Mto Rufiji, is entered close within the eastern entrance point to the Simba Uranga mouth; it trends eastward for about one mile and then runs nearly parallel with the Simba Uranga arm, with depths of from 2½ to 5 fathoms ($4^{m}6$ to $9^{m}1$), as far as Salale, which is the largest of many villages on this arm. About 1½ miles above Salale, a passage, about half a mile in length, connects the Suninga and Simba Uranga arms.

Some high casuarina trees about three-quarters of a mile eastward of the eastern entrance point, and a single casuarina tree on the western entrance point are usually the first objects sighted, from a distance of about 6 miles, when approaching from seaward; the eastern entrance point and a clump of coconut palms on the island of Suninga nearly 1¼ miles south-south-westward of it, may next be identified, at a distance of about 3 miles.

When sighted, the western extreme of the eastern entrance point in line with the western edge of the clump of coconut palms mentioned above leads up to the entrance. After passing the old Simba Uranga Custom House on the western entrance point, vessels should enter the Suninga arm and proceed to an anchorage off Salale, keeping closer to that side which has the steeper and higher bank.

Care must be exercised when rounding the hairpin bend southward of the southern side of Suninga island.

Vessels are advised not to attempt the entrance during the ebb tidal stream which has been reported to set in an easterly direction across the banks outside the entrance; the flood stream has been reported to set in a north-westerly and westerly direction, but less strongly.

Kikunya mouth.—Buoy.—This mouth, the northernmost and largest of the mouths forming the delta of Mto Rufiji, is entered between Ras Simba Uranga, about 3 miles north-north-westward of the Simba Uranga mouth, and the village of Kikunguni, about 3 miles north-north-westward. It has no bar, and, by steering 223° for the centre of the entrance, a least depth of one fathom ($1^{m}8$) will be obtained. The passage of this mouth to within about 2 miles of the village of

Chart 1032.

Kikunya, which lies about 9 miles from the coast, presents no difficulties but the branch then becomes narrow with sharp bends, and has depths of only about 3 feet (0^m9) at half tide. About one mile below Kikunya (*Lat. 7° 50′ S., Long. 39° 15′ E.*), there is a deep basin, with depths of from 4 to 6 fathoms (7^m3 to 11^m0), where dhows load cargoes.

The wreck of the *Königsberg* lies about 10 miles above the entrance, at the mouth of a creek which is connected to the head of the Simba Uranga arm.

The Kikunya mouth is only connected to Mto Rufiji by branches with the Simba Uranga arm, and the water is salt; this is also the case with the water in all the mouths and creeks northward of the Msala mouth, as so small an amount of fresh water finds its way to them, that it produces but little effect.

A black conical buoy is moored about 6 miles north-eastward of Kikunguni village.

Mto Rufiji above the delta.—Bars.—Above its delta, Mto Rufiji is not nearly the size that might be expected from the number and widths of its mouths; by the time that the inundation caused by the interior rains, has subsided, and the current has become sufficiently reduced in strength to permit the passage of boats, the navigable channel is very limited and is obstructed by many shoals and banks.

Below Batja, at the junction of the Bumba branch of the Msala mouth, the river banks are continuously lined with mangroves; above this point, the country becomes more open and villages are numerous, the huts being built on poles, owing to the floods which cover vast areas.

The holding ground in the river is bad, and, except in a few places, it is unsafe to anchor, securing to trees on the banks being more satisfactory. Floating islands of grass and weed, are common. Native canoes work up and down the river in spite of the extremely strong current, but dhows do not ascend above Msomene, about 26 miles above Salale.

In March 1917, when the river had risen considerably above low river level, H.M.S. *Mersey*, a vessel of length 265 feet (80^m8), beam 49 feet (14^m9) and draught 6¼ feet (1^m9), was navigated as far as Msomene (*Lat. 8° 03′ S., Long. 39° 15′ E.*).

In 1892, Mto Rufiji was ascended by a German officer in a steam boat of a draught of 5½ feet (1^m7), with a small boat in tow, as far as Kunglio, which is over 70 miles in a direct line, westward of Msomene; further progress was stopped by the Pangani falls, a short distance above Kunglio.

There are several bars in the river, the positions of, and depths on which are constantly varying; the two worst are just above Usimbe, about 20 miles above Salale, and close below Titange. Although the distance between the river's banks is about 300 yards (274^m3) at these positions, the navigable channel is often very narrow and subject to frequent changes; on one occasion, a depth of 8½ feet (2^m6) was found on both these bars in March, while, later on in the same month, less depths were obtained on them, although the river had risen several feet during the interval.

High and low river.—Current.—Tidal stream.—In 1911, it was stated in a German report that low river level continues in Mto

Charts 662, 669, 597, 748b, 2483.

Chart 1032.

Rufiji from August to December; between December and March there is some rise in the level of the river which temporarily improves matters, but, as a whole the lower part of Mto Rufiji is not again navigable before April.

A sketch survey of Mto Rufiji between Salale and Utete, about 63 miles, was made by H.M.S. *Mersey* during February and March, 1917. By February in that year, the river had already risen 7 feet (2^{m}1), and it reached its highest, 16½ feet (5^{m}0), above normal low river level, about 20th April; these floods are said to have been the highest for 9 years.

At Kunglio, near the head of navigation, a German report of 1892 estimated the difference in level between high and low river to be about 15 feet (4^{m}6), being highest in March and lowest in November.

The rate of the river current has been found to be from 3 to 5 knots, and even exceeds 5 knots in places. The greater volume of the water from Mto Rufiji appears to flow through Mto Usimbe, and, in consequence, the current in the main river is not felt so strongly below Usimbe.

The limit of tidal waters is stated to be at Msomene (*Lat. 8° 03′ S., Long. 39° 15′ E.*), but during floods, the in-going tidal stream is not felt for more than a mile above the junction of the Bumba branch.

MAFIA.—Aspect.—The island of Mafia is situated about 15 miles eastward of the northern part of Mto Rufiji delta, from which it is separated by Mafia channel, which is described on page 341.

The island is 26 miles in length between Ras Kisimani, its south-western extreme, situated about 20 miles northward of Okuza island, *see* page 333, and Ras Mkumbi, its northern extreme, is composed of coral, and the coast is generally low, but it has a central plateau which is from 70 to 100 feet (21^{m}3 to 30^{m}5) high, on which are trees, rising to an elevation of 200 feet (61^{m}0). Its outline is devoid of any remarkable feature.

The north-western part of the island is much cut up by mangrove swamps and creeks, but large parts are cultivated and there are numerous coconut groves. The eastern coast is cliffy, steep-to and fringed by a narrow coral reef on which the sea breaks furiously. The southern and western coasts are fringed by reefs of varying width, off which there are numerous detached reefs and shoals.

The principal village is on Chole, a small island about 10 miles eastward of Ras Kisimani, close off the southern coast; there are numerous other villages, but they are all very small. The Government station is at Kilindoni, on the north-western coast, about 5 miles east-north-eastward of Ras Kisimani.

There is a regular air service between the island of Mafia and Dar es Salaam.

Southern coast of Mafia.—Off-lying islands and dangers.—Anchorage.—Ras Kisimani is low and sandy and has a fan-shaped clump of coconut palms near its extreme. It is steep-to, and good anchorage may be obtained westward of the point, and, during the north-east monsoon, there is good landing close southward of the point. There is a village near Ras Kisimani; supplies are difficult to secure, but water can be obtained by digging in the sand northward of the point.

Charts 662, 669, 597, 748b, 2483.

Chart 1032.

Between Ras Kisimani and the coast close westward of Chole, nearly 10 miles eastward, the coast is low, fringed with a belt of mangroves in places, and backed by coconut groves; some red cliffs, 60 feet ($18^{m}3$) high, are situated at Kitoni, about 2½ miles south-eastward of Ras Kisimani, and are prominent.

This stretch of coast is fronted by an extensive reef which dries in places, and which extends as much as 3½ miles offshore southward of Kitoni, where it is known as Okuto.

The islands of Chole, Juani and Kibondo and several small islets, stand on a reef which lies off the south coast of Mafia; this reef dries 8 feet ($2^{m}4$) in places, and is steep-to on its outer or south-eastern edge.

Kibondo, the southernmost of these islands, situated about 10 miles south-eastward of Ras Kisimani, is a flat coral island with a clump of tall trees at its southern point, and some coconut palms on its north-western point, both of which are noticeable. Juani lies near the north-eastern edge of the reef, about 2 miles north-eastward of Kibondo; its seaward coast, a cliff, about 10 feet ($3^{m}0$) high, runs parallel with, and close within, the edge of the reef, while its inner coast is partly cliff and partly mangroves. Chole (*Lat. 7° 58′ S., Long. 39° 46′ E.*), about 3 cables north-westward of Juani, is small, but it contains the principal village and trading place in Mafia.

Tutia, a detached reef which lies about three-quarters of a mile southward of the south-western extreme of the reef surrounding Kibondo, and about 11 miles south-south-eastward of Ras Kisimani, is the southernmost danger off Mafia, and is the northern entrance point to South Mafia channel. A sandbank on the north-western part of Tutia dries 12 feet ($3^{m}7$), and the sea always breaks heavily on the southern edge of the reef.

Mange, and the dangers near it in Mafia channel, are described on page 341.

Sheltered anchorage may be obtained in Kibondo anchorage, a bight between the reefs of Kibondo and Okuto; a good berth is with the southern islet near Kibondo bearing 088°, and the north-western end of the sandbank on Tutia, bearing 183°, in a depth of 6 fathoms ($11^{m}0$), sand and mud.

When approaching this anchorage, it should be borne in mind that the sandbank is on the inner side of Tutia, and that the current sets towards the reef.

Chole bay.—Chole bay is situated at the south-eastern corner of Mafia, the southern shore of the bay being formed by the northern coasts of Chole and Juani; the bay has not been completely examined, but there are depths of from 4 to 8 fathoms ($7^{m}3$ to $14^{m}6$) in the deeper parts. There are two entrances; the south-western entrance is approached from Kibondo anchorage and passes inside Kibondo, Juani and Chole. It is available for boats except at low water springs, and at high water vessels of a draught of 10 feet ($3^{m}0$) can enter. Kinasi pass, the eastern entrance, lies between the northern extreme of Juani and Miewi or Jina, an island about 1¼ miles northward; there are depths of from 6 to 11 fathoms ($11^{m}0$ to $20^{m}1$) in this entrance, but the tidal streams run through it with such velocity that, unless well buoyed, it would be unsafe for any vessel to attempt to enter.

Eastern coast of Mafia.—Light.—Off-lying dangers.—Between

Charts 662, 669, 597, 748b, 2483.

Chart 1032.

Miewi and Ras Mkumbi, about 19 miles north-north-eastward, the eastern coast of Mafia consists of low, level cliffs, about 10 feet (3^{m}0) high, with few indentations, and is fringed with a narrow coral reef, which is steep-to.

Ras Mkumbi is formed by a coral cliff, about 15 feet (4^{m}6) high, within which the land rises to an elevation of about 80 feet (24^{m}4) and is covered with small bushes and trees; the sea nearly always breaks on the fringing reef, which extends about three-quarters of a mile northward of Ras Mkumbi.

A light is exhibited, at an elevation of 102 feet (31^{m}1), from a quadrangular tower, 98 feet (29^{m}9) in height, painted with red and white bands, situated on Ras Mkumbi. *See* view on chart 1032.

A 2-fathom (3^{m}7) patch lies about one mile north-eastward of Ras Mkumbi lighthouse; vessels should round the point at a distance of at least 2 miles.

For about 5 miles northward of Ras Mkumbi, the depths are very irregular, and a 9-fathom (16^{m}5) patch lies about 5 miles north-westward of the point; although no shoaler depths have been found, vessels should navigate with caution in this vicinity. The rush of the current is plainly visible in places where the depths are not less than 20 fathoms (36^{m}6), and makes these places appear like dangers.

North-western coast of Mafia.—Tirene bay.—Off-lying dangers.—The north-western coast of Mafia forms the south-eastern side of North Mafia channel; the dangers in this channel which lie adjacent to the track indicated on the chart, are described on page 343.

Tirene bay is entered between Ras Kisimani, *see* page 337, and Ras Mbisi (*Lat. 7° 49′ S., Long. 39° 43′ E.*), about 10 miles north-eastward; about one mile southward of Ras Mbisi, there are some high trees standing close westward of the entrance to a mangrove creek. The land within the shores of the bay is about 100 feet (30^{m}5) high, but Ngombeni Shamba, a clump of mangoes, 175 feet (53^{m}3) high, about 2¾ miles eastward of Ras Kisimani, shows up more conspicuously than other lower clumps, and Palm hill, situated close within the centre of the bay, about 5½ miles north-eastward of Ras Kisimani, has a conical summit, 170 feet (51^{m}8) high, covered with coconut palms, which is noticeable when seen from some distance. Lechmere hill, 160 feet (48^{m}8) high, lies about 2¼ miles southward of Ras Mbisi, and the Residency at Kilindoni, situated about one mile south-westward of Palm hill, is also prominent; there is a flagstaff about 1½ cables westward of the Residency.

A drying sandbank fringes the coast between Ras Kisimani and Ras Mbisi, and a bank on which the depths are less than 3 fathoms (5^{m}5) fronts this sandbank, its south-western part projecting northward in a spit, the northern extreme of which lies about 5 miles north-eastward of Ras Kisimani.

Tirene reef, a reef awash, lies about 4¼ miles south-westward of Ras Mbisi; it is steep-to on its southern side, but shoal depths extend about three-quarters of a mile northward of it.

Salim bank, lying about one mile westward of Tirene reef, is described on page 342.

A reef, which dries 4 feet (1^{m}2), lies about 3 miles west-north-westward of Ras Mbisi.

Charts 662, 669, 597, 748b, 2483.

Chart 1032.

Buoys.—A black, conical buoy marks the extreme of the spit which projects north-eastward of Ras Kisimani.

A black, conical buoy marks the eastern side of the shoal extending northward of Tirene reef.

A conical buoy, painted in red and white bands, is moored near the edge of the 3-fathom ($5^{m}5$) bank, which extends offshore abreast Kilindoni.

Tidal streams.—The tidal stream of the rising tide sets fairly strongly into Tirene bay from the north-western extreme of Salim bank. At the anchorage in the bay, the tidal stream was observed to set northward at the rate of half a knot at 3 hours after high water, and southward at a similar rate, at 3 hours before high water.

Anchorage.—Directions.—Good anchorage may be obtained in Tirene bay, in depths of about 6 fathoms ($11^{m}0$), with Ras Mbisi bearing 040°, either abreast the village of Tirene, situated about one mile north-eastward of Palm hill, or farther south-westward, off Kilindoni, with the Residency bearing about 140°.

Vessels from southward should pass northward of Salim bank.

Vessels should approach the anchorage with Palm hill bearing 164°, which leads westward of the reef which dries 4 feet ($1^{m}2$), situated west-north-westward of Ras Mbisi, and eastward of Tirene reef; when Ras Mbisi bears about 040°, course may be shaped for the selected anchorage.

Coast.—Off-lying island and dangers.—Between Ras Mbisi (*Lat. 7° 49′ S., Long. 39° 43′ E.*) and Ras Murundo, a sandy point with high trees on its extreme, about 4½ miles east-north-eastward, is Kirongwe bay, which is shallow and choked with banks of sand and mud. Mwamba Mkuu, a reef which dries 8 feet ($2^{m}4$) at its outer edge, extends about 2½ miles north-north-westward of Ras Murundo, and detached drying patches of reef lie between Ras Mbisi and Ras Murundo.

Between Ras Murundo and Ras Mkumbi, about 11½ miles north-eastward, the coast is chiefly sandy with occasional low, coral cliffs and some mangrove creeks, one of which, entered about 4½ miles north-eastward of Ras Murundo, is connected to Mto Kirongwe, at the head of Kirongwe bay.

Barakuni is an island which lies about 4 miles northward of Ras Murundo; it is sandy and covered with casuarina trees, the tops of which were, in 1874, about 100 feet ($30^{m}5$) high. It stands on the south-western edge of a drying reef, from which a shoal spit extends about 2 miles south-westward, leaving a narrow, deep channel between it and Mwamba Mkuu; two reefs, awash, lie south-westward of this spit, about 3½ and 2 miles, respectively, northward of Ras Mbisi.

For about 3 miles north-north-westward and 2 miles north-westward of Barakuni there are a number of sunken reefs, on some of which the sea breaks heavily. The tidal streams attain considerable velocity in the narrow channels between these reefs.

Anchorage.—Landing.—During the south-west monsoon, when the wind is not too strong, good anchorage may be obtained south-westward of Ras Mkumbi, in depths of from 8 to 14 fathoms ($14^{m}6$ to $25^{m}6$), sand and mud, at from 1½ to 3 miles offshore. A good berth, and convenient for landing, is in a depth of 9 fathoms ($16^{m}5$),

Charts 662, 669, 597, 748b, 2483.

Chart 1032.

sand and mud, with Ras Mkumbi lighthouse bearing 057°, and Ras Bueni, about 3½ miles south-westward of Ras Mkumbi, bearing 117°.

The coast near this anchorage is fringed by reefs whose width varies from a few hundred yards to one mile, and the outer edge, although not steep-to, can be clearly seen at low water; after half tide, boats may land anywhere, but at, or near, low water, the best landing place is at Ras Bueni, where there is but little reef.

Fair quantities of fresh provisions may be obtained at Bueni and at the adjacent villages.

MAFIA CHANNEL.—Depths.—Mafia channel lies between Mafia and the mainland, and, although much encumbered with reefs, it is easily navigable by day. North-bound vessels have nothing to gain by using this channel, as the current outside Mafia is favourable to them, but for south-bound vessels of moderate draught and low power, it may be of considerable advantage.

The southern portion of Mafia channel is divided into two channels by Boydu (*Lat. 7° 56′ S., Long. 39° 31′ E.*), an island which is situated about 3½ miles westward of Ras Kisimani; the channel eastward of Boydu is known as Kisimani channel, and that westward of it as Msala channel.

The track recommended is indicated by a pecked line on the chart and this track is buoyed, but reliance should not be placed on the buoys being in position. The channel is best navigated at low water when the reefs are most easily seen, but near and northward of the delta of Mto Rufiji, the water is frequently thick which renders sunken dangers indistinguishable.

There is a least depth of 6 fathoms ($11^{m}0$) in Mafia channel, unless the alternative track, westward of Sefo, where there are depths of from 4 to 5 fathoms ($7^{m}3$ to $9^{m}1$), is taken.

Kisimani channel.—Islands and dangers.—Beacons.—Buoys.—Kisimani channel is entered north-westward of Tutia and Kibondo anchorage, described on page 338, between Mange, about 7 miles southward, and Fungu Marima, about the same distance south-westward, of Ras Kisimani; the former is a drying reef, on the northern part of which is a sandbank, which dries 12 feet ($3^{m}7$).

A beacon, consisting of a pole, surmounted by a ball, about 30 feet ($9^{m}1$) high, stands on the northern part of the sandbank on Mange.

Fungu Marima is a reef which dries 4 feet ($1^{m}2$) in places; a spit, with depths of 2 and 3 fathoms ($3^{m}7$ and $5^{m}5$), extends over one mile southward of the southern extreme of the reef.

Kauri, a reef on the western side of the channel, about 4½ miles south-south-westward of Ras Kisimani, dries 6 feet ($1^{m}8$) in places.

A reef was reported, in 1940, about 8 cables eastward of Kauri and 4 miles south-south-westward of Ras Kisimani; reefs were also reported about 8 cables northward and 1¼ miles north-westward of the northern extremity of Kauri.

Belami is a reef which lies on the western side of the channel, about 1¾ miles south-westward of Ras Kisimani; its northern part is awash.

Between Mange and Ras Kisimani, the eastern side of Kisimani channel is formed by a bank on which the depths are as little as 3 feet ($0^{m}9$), which extends as much as 1½ miles off the southern coast of Mafia between Ras Kisimani and Kitoni red cliffs.

Charts 662, 669, 597, 748b, 2483.

Chart 1032.

A black conical buoy marks the western edge of the above bank, about 2½ miles southward of Ras Kisimani.

Boydu, mentioned above, stands on an extensive reef which separates Kisimani and Msala channels; the island is sandy and covered with casuarina trees and there are two small islets close southward of it. The northern edge of the reef surrounding Boydu is fronted by a bank on which the depths are less than 3 fathoms ($5^{m}5$) which terminates in a spit, the northern extreme of which lies about 4½ miles northward of Boydu.

Maduvi is a small sandbank which dries 13 feet ($4^{m}0$), lying on the western side of the channel about 2 miles north-eastward of Boydu (*Lat. 7° 56′ S., Long. 39° 31′ E.*). A narrow spit, on which the depths are less than 3 fathoms ($5^{m}5$), extends nearly 4 miles northward of Maduvi, its eastern edge, which forms the western side of the channel, being steep-to, and generally indicated by a line of discoloured water.

Al Hadjiri is a reef which lies on the eastern side of the channel, about 3½ miles northward of Ras Kisimani; there is a sandbank on it which dries 6 feet ($1^{m}8$) and which, when covered, is generally indicated by discoloured water, but a 3-fathom ($5^{m}5$) shoal extends about half a mile south-westward of the sandbank towards the channel, and should be avoided.

Salim bank is a shoal of sand and coral, with a least depth of one fathom ($1^{m}8$), situated at the north-western end of Kisimani channel, about 5½ miles northward of Ras Kisimani.

A red can buoy is moored at the north-western extreme of Salim bank.

Sefo is a reef which lies about 6½ miles northward of Ras Kisimani at the northern end of Kisimani channel; the track passes on either side of this reef. There is a sandbank on the reef which dries 12 feet ($3^{m}7$) and which is usually visible.

A beacon, surmounted by a cross, stands on the sandbank on Sefo.

Msala channel.—This channel, which lies between Boydu with its surrounding shoals and the mainland between the Kiassi mouth and Ras Twana, is not buoyed, and is encumbered by numerous shoals and reefs, especially in its southern part, where that part of the channel between Fungu Marima and the Kiassi mouth, is almost filled with shoals.

Islands and dangers between Sefo and the island of Niororo.—Buoy.—Wumi is a reef which lies on the western side of the track, about 11½ miles northward of Ras Kisimani; it dries 2 feet ($0^{m}6$), but having no sand on it, is not easily distinguished at high water. A 2-fathom ($3^{m}7$) shoal, lies one mile westward of Wumi.

A reef, awash, lies on the eastern side of the track, about 5 miles north-westward of Ras Mbisi.

Shungu-mbili (*Lat. 7° 42′ S., Long. 39° 41′ E.*), a sandy island with high trees on it, lies on the eastern side of the track, about 7 miles northward of Ras Mbisi. The island stands on the southern edge of a reef which dries 3 feet ($0^{m}9$), and which is surrounded by a bank on which the depths are less than 3 fathoms ($5^{m}5$), which extends as much as 1¼ miles westward of the island. A bank on which the depths are less than 10 fathoms ($18^{m}3$), extends in a narrow tongue about 3 miles south-south-westward of Shungu-mbili, and has at its extreme, a 2-fathom ($3^{m}7$) patch; a shoal patch with a depth

Charts 662, 669, 597, 748b, 2483.

Chart 1032.

of less than 6 feet (1^m8), and Fly rock, with a least depth of one foot (0^m3), are both situated on this bank at 2 miles and one mile, respectively, south-south-westward of Shungu-mbili.

A red can buoy is moored at the western extreme of the bank extending 1¼ miles westward of Shungu-mbili (*Lat. 7° 42′ S., Long. 39° 41′ E.*).

Fili, a reef which dries one foot (0^m3), lies on the western side of the track, about 3½ miles west-north-westward of Shungu-mbili; as there is no sand on it, the reef is not easily distinguished at high water.

Niororo is an island which lies on the eastern side of the track, about 5 miles northward of Shungu-mbili; it is covered with bushes and has on it one large tree, which, when seen some distance from northward, resembles the smoke of a steam vessel. The island stands on the western edge of an extensive shoal bank, on which are numerous drying reefs; on the north-western extreme of the reef on which the island stands, is a sandbank, which dries 5 feet (1^m5), and this part of the reef deflects the tidal streams north-westward, and causes tide rips which often make the reef appear to extend farther north-westward than is actually the case.

Anchorage.—Anchorage may be obtained in a depth of 9 fathoms (16^m5), sand, about half a mile north-westward of Niororo. Landing is difficult at low water, the best place being on the south-western side of the island. There is a well of brackish water, and the island is frequented by turtle between January and June.

Shungu-mbili pass.—Shungu-mbili pass is the name given to the channel between the reefs which surround Niororo and the shoals which extend north-north-westward of Barakuni.

Dangers in North Mafia channel northward of Niororo.—A shoal with a least depth of 3 fathoms (5^m5), lies about 3½ miles eastward of Niororo and there is a similar shoal about 5 miles east-north-eastward of the island.

Gordon reef, a sunken reef with a depth of less than 6 feet (1^m8) over it, lies on the eastern side of the track, about 3 miles north-north-eastward of Niororo.

Vulture bank, on which there is a least depth of 2 fathoms (3^m7), lies about 6 miles north-eastward of Niororo.

Fawn bank consists of several patches, with depths of from 5 to 10 fathoms (9^m1 to 18^m3) over them, which lie across the northern entrance to the channel, about 6½ miles northward of Niororo.

In addition to the above dangers, several patches with depths of between 4 and 9 fathoms (7^m3 and 16^m5), which have not been closely examined, have been reported in an area between 5 and 9 miles north-eastward of Niororo.

Kwale is the general name of a number of reefs lying on the western side of the track and between 5 and 15 miles from the coast of the mainland. The outermost of these reefs are described below, and the remainder are described on page 346. Owing to the density of the water, most of these reefs are only visible at low tide.

Dira is a reef which lies on the western side of the track, about 7 miles west-north-westward of Niororo (*Lat. 7° 37′ S., Long. 39° 41′ E.*), and has on its western side, a sandbank which dries 10 feet (3^m0). The reef is generally distinguishable and the sea always breaks on it.

Chart 1032.

Between Niororo and Dira there are numerous patches with from 6 to 10 fathoms (11^{m}0 to 18^{m}3) over them.

Muni patches are three small coral heads, with 2 fathoms (3^{m}7) over them, lying on the western side of the track, between 12 and 15 miles north-north-westward of Niororo. They are very steep-to and their positions are only indicated by tide rips.

Chart 662.

Field patch is a small coral head, with a depth of 5 fathoms (9^{m}1), lying on the western side of the track, about 16 miles northward of Niororo.

Chart 1032.

Tidal streams and currents in Mafia channel.—Southward of Ras Kisimani, the tidal stream of the rising tide sets north-westward, and that of the falling tide sets south-eastward, but northward of that point, the direction of the tidal streams is nearly reversed, the tidal stream of the rising tide setting southward, and that of the falling tide setting north-eastward; the tidal streams, however, are frequently overpowered by the constant north-going current, especially at neaps.

The direction of the tidal streams depends considerably on the wind, and during strong south-easterly winds, except at springs, it is almost certain that a constant strong north-going current will be experienced throughout the passage of Mafia channel.

In Kisimani channel, between Mange and Sefo, the tidal streams or current, generally follow the direction of the channel, but a north-easterly set may be experienced on passing Al Hadjiri with a falling tide.

North-westward of Ras Mkumbi, in depths of less than 100 fathoms (182^{m}9), the movement of the water is tidal, the tidal stream of the rising tide setting south-westward, and that of the falling tide, setting north-eastward; the direction, however, may vary several points either way.

Charts 1032, 662.

Directions for Mafia channel and inner channel to Kilwa Main pass.—As previously stated, north-bound vessels have nothing to gain by using Mafia channel; the following directions are therefore written for south-bound vessels.

From a position about 5 miles eastward of Ras Kanzi lighthouse, *see* page 348, steer 174°. The single large tree on Niororo (*Lat.* 7° 37′ *S.*, *Long.* 39° 41′ *E.*) should be seen when abreast Muni patches; when sighted, it should be brought to bear 178° and then steered for on that bearing until Shungu-mbili is sighted, when the latter island should be kept bearing 178° and just open westward of Niororo, which line crosses Fawn bank in a depth of 10 fathoms (18^{m}3). Keep this mark on until within about 2¾ miles of Niororo, when the track, indicated by pecked lines on the chart, may be followed, passing about three-quarters of a mile westward of the north-western extreme of the reef surrounding Niororo, between Fili and Shungu-mbili, and about one mile eastward of Wumi.

If anchoring at Kilindoni, *see* page 340.

After passing Wumi, vessels may pass on either side of Sefo; at low water, when the edges of the banks can be seen, the deeper channel, eastward of Sefo, is to be preferred, but at high water, the channel

Charts 669, 597, 748b, 2483.

westward of Sefo, where the depths are from 4 to 5 fathoms (7^{m}3 to 9^{m}1), was, at the time of the survey in 1877, recommended as being preferable.

From abreast the western side of Sefo, course should be shaped about 168° to pass between Al Hadjiri and Maduvi, and about half a mile westward of Ras Kisimani, and this course should be held until the red cliffs at Kitoni are nearly abeam, when course should be altered to pass nearly one mile westward of Mange.

After passing Mange, course should be shaped about 206° to pass about 1¼ miles eastward of Simaya, *see* page 332, whence course may be altered to about 193° to pass between Banda and Membeuso and then between Machangi and Chocha. The latter reef is not easily seen on account of the higher part of the bank on it being at its western end.

After passing between Machangi and Chcoha, vessels may pass on either side of Poiasi and Pwajuu; if passing eastward of these reefs, regard should be paid to the reef reported, in 1950, to exist about 1¾ miles north-north-eastward of Jewe beacon (page 328). If not calling at Kilwa Kivinje, vessels may enter Kilwa Main pass by passing between Luala and Jewe, taking care to avoid the 5-fathom (9^{m}1) shoal, situated nearly 2 miles northward of the north-eastern extreme of Jewe.

If calling at Kilwa and passing eastward of Poiasi and Pwajuu, when the high trees on the north-western extreme of Songo Songo, bear 028°, they should be brought astern as a stern mark, and a course of 208° steered until the eastern edge of Singino hill bears about 176°, when the latter should be steered for on that bearing, which will lead to the anchorage at Kilwa Kivinje.

If passing westward of Poiasi and Pwajuu, the eastern edge of Singino hill should be brought to bear 176° by the time that the high trees on the north-western extreme of Songo Songo, bear 028°.

KIKUNYA MOUTH TO RAS NDEGE.—Coast.—Buoy.— Between Kikunguni village, *see* page 335, and Ras Pembamnasi (*Lat. 7° 11′ S., Long. 39° 31′ E.*), about 32 miles north-north-eastward, the coast is chiefly sandy with no marked projections, and is fronted by a drying mudbank which extends as much as one mile offshore in places; several rivers, with wide mouths, enter the sea along this coast and, although all the mouths dry, the rivers are accessible to small craft at high water.

The black conical buoy, moored about 6 miles north-eastward of Kikunguni village was referred to on page 336.

The southern part of this coast is backed by the Mtoti hills, a flat-topped range running parallel with the coast, about 6 miles inland. Kanoge hill, 700 feet (213^{m}4) high, with a conspicuous clump of trees on its summit, stands at the southern end of the range, about 8 miles westward of Kikunguni village, whence the range decreases in elevation to about 300 feet (91^{m}4), at its northern end, about 16 miles northward. Binga hill, an isolated flat-topped hill, 530 feet (161^{m}5) high, standing about 17 miles west-south-westward of Ras Pembamnasi, and about 10 miles northward of the Mtoti range, is the most prominent feature of the northern part of this stretch.

The land close within the coast is well cultivated and thickly populated, the most important of the numerous villages along the coast

Charts 1032, 662.

being, Kavinga, 5 miles northward of Kikunguni; Kivumangao and Yandope, 7 and 8 miles, respectively, farther northward; Kisiju, 5 miles northward of Yandope, and Bosa, 5 miles westward of Ras Pembamnasi.

Southward of Ras Pembamnasi, the coast trends westward and forms a shallow bight, known as Shungu bay, at the head of which, Mto Shungu Bweni enters the sea through a wide mouth, which dries, but boats may ascend the river for some distance at high water. Ras Pembamnasi is low, fringed with mangroves and backed with higher trees; a drying reef extends about 5 cables southward, and a detached reef, which breaks, lies a few cables eastward of Ras Pembamnasi.

Several small islands, with numerous reefs outside them, lie off the coast; the latter are known as the Kwale reefs, most of which only show at low tide on account of the muddy water. These islands and reefs break the ocean swell, and, in ordinary weather, except at places abreast the channels between them, landing may be easily effected.

The offshore depths increase very gradually and there is a navigable channel, with a soft muddy bottom, inside the islands; this channel is invariably used by dhows.

Off-lying islands and dangers between the villages of Kikunguni and Kisiju.—Anchorage.—Landing.—Buoy.—Koma, the southernmost of these islands, is a coral island with trees on it, situated about 10 miles north-eastward of the village of Kikunguni; its northern and eastern sides are fringed with mangroves, and it stands on a reef, on the outer part of which are several small, bush-covered islets, the northernmost being Pemba-juu (*Lat. 7° 31′ S., Long. 39° 25′ E.*), on which are some trees.

There are depths of from 3 to 4 fathoms (5^{m}5 to 7^{m}3), in the channel between Koma and the coast.

Good anchorage in either monsoon may be obtained northward of Koma, in a depth of 6 fathoms (11^{m}0), mud, with Pemba-juu bearing about 094°, distant about 7 or 8 cables.

Good landing may be obtained on a sandy spit on the western side of the island. There are two large villages in the centre of the island, and good water may be obtained from a well near its western extreme, which is easy of access. Some fresh provisions may be obtained, the natives preferring rice and biscuit in exchange, rather than money.

Hatambura, a rocky islet with trees on it, is situated nearly 3 miles northward of Koma; the islet stands on a narrow rocky reef, which has depths of 5 and 6 fathoms (9^{m}1 and 11^{m}0), close-to.

Kwale is a coral island, covered with trees, the tops of which are about 100 feet (30^{m}5) high, situated about 4½ miles northward of Hatambura. Kwale is surrounded by an extensive reef, on the eastern side of which are three bushy islets, known as the islets of Chokaa.

A black conical buoy is moored 3 cables northward of the western extremity of the reef surrounding Kwale.

There is a least depth of 14 feet (4^{m}3), mud, in the narrow channel between Kwale and the coast.

Ukamba is a reef which lies about 8 miles eastward of Kwale; near its north-eastern extreme is a sandbank, which dries 10 feet (3^{m}0), but on which the sea does not always break.

Charts 669, 597, 748b, 2483.

Charts 1032, 662.

Muni patches, about 11 miles eastward of Kwale, and Dira, about 10 miles eastward of Koma, are described on pages 344 and 343. In the area westward of Dira and Ukamba, there are numerous reefs, some of them awash, but they lie out of the usual track of vessels and their positions may best be seen on the chart.

Chart 662.

Off-lying island and dangers between the village of Kisiju and Ras Pembamnasi.—Anchorage.—Bussard reef, with less than 6 feet ($1^{m}8$) over it, lies about 7 miles eastward of Kwale; a 2-fathom ($3^{m}7$) shoal lies about 1½ miles south-eastward of Bussard reef.

North Fanjove island (*Lat. 7° 20′ S., Long. 39° 29′ E.*) is a sandy island covered with trees, situated about 6 miles north-eastward of Kwale; it is surrounded by a drying reef, and there are several detached patches of reef situated between North Fanjove island and Kwale.

In 1915, a vessel reported striking a sunken obstruction about 4 miles east-south-eastward of North Fanjove island.

Field patch, situated about 10 miles eastward of North Fanjove island, is described on page 344.

In 1916, a depth of 6 fathoms ($11^{m}0$) was reported in a position about 5½ miles east-north-eastward of North Fanjove island, at the southern end of a 10-fathom ($18^{m}3$) bank; strong tide rips were observed in this position, and it is possible that there are less depths in the vicinity.

Sukuti, the northernmost of the reefs known under the general name of Kwale, is an extensive group of reefs lying between 2 and 6 miles northward of North Fanjove island; on the western side of the group is a coral head which dries 10 feet ($3^{m}0$), near which are two mangrove trees; the sea always breaks heavily on the outer edges of these reefs.

Vyumbani is a group of reefs awash, lying close westward of the south-western corner of Sukuti.

There are depths of 11 fathoms ($20^{m}1$) in the channel between North Fanjove island and the southern edge of Sukuti and Vyumbani; a distinctive high clump of trees, situated on the northern entrance point to Mto Dendeni, about 7 miles westward of North Fanjove island, bearing 269°, leads through this channel, but passes over the position of the 6-fathom ($11^{m}0$) depth mentioned above, reported in 1916.

There is a least depth of 3 fathoms ($5^{m}5$) in the channel between Vyumbani and Sukuti and the mainland, but the former reefs do not show at high water.

. Good anchorage for small craft may be obtained during either monsoon, westward of Sukuti, in depths of 3 or 4 fathoms ($5^{m}5$ or $7^{m}3$); this anchorage is more easily entered from Shungu bay.

Buuni bay.—Anchorage.—Directions.—Buuni bay is entered between Ras Pembamnasi and Ras Mwambamku, a high mangrove point, about 4 miles north-eastward. A drying reef extends about one mile southward of Ras Mwambamku, and a 3-fathom ($5^{m}5$) spit projects about one mile south-westward of the reef.

A 2-fathom ($3^{m}7$) shoal is situated about 2 miles east-north-eastward of Ras Pembamnasi, midway between the breaking reef eastward

Charts 669, 597, 748b, 2483.

Chart 662.

of the latter point, and the extreme of the spit extending south-westward of Ras Mwambamku.

During the north-east monsoon, anchorage may be obtained in Buuni bay, in a depth of 5½ fathoms ($10^{m}1$), sand and mud, with Ras Mwambamku bearing 020°, and the southern extreme of Mwambamku reef, bearing 082°, but the swinging space is rather restricted.

Vessels from southward should approach with the highest trees on Ras Pembamnasi (*Lat. 7° 11′ S., Long. 39° 31′ E.*) bearing 330°, and when the eastern extreme of Ras Mwambamku bears 023°, the latter point should be steered for on that bearing, which will lead, in a depth of 4½ fathoms ($8^{m}2$), between the breaking reef off Ras Pembamnasi and the 2-fathom ($3^{m}7$) shoal, to the anchorage.

About 1½ miles westward of Ras Mwambamku, there is a patch of red cliff; vessels from northward should steer for this cliff, bearing 319°, which will lead, in a depth of 5 fathoms ($9^{m}1$), between the 2-fathom ($3^{m}7$) shoal and the spit extending south-westward of Ras Mwambamku, until the latter point bears 020°, when course may be shaped for the anchorage.

Coast.—Light.—Off-lying danger.—Between Ras Mwambamku and Ras Kanzi, about 7 miles northward, the coast is low and swampy for the first 3 miles, but thence rises to cliffs, about 80 feet ($24^{m}4$) high, at Puna point, about one mile farther northward. The reef which fringes this coast, is narrow, especially at its northern part, and its outer edge is steep-to.

There are a large number of palmyra palms close to Ras Kanzi, which may assist in identifying it, as there are none elsewhere on this coast. Puna hill, a small, isolated, rounded hill, 240 feet ($73^{m}1$) high, stands about 4 miles west-south-westward of Ras Kanzi, and is more distinctive when seen from southward.

A light is exhibited, at an elevation of 62 feet ($18^{m}9$), from a white quadrangular tower, with white dwelling, 31 feet ($9^{m}4$) in height, situated on Ras Kanzi (*Lat. 7° 01′ S., Long. 39° 33′ E.*).

Chart 640a.

Ras Kimbiji, a low, cliffy projection, about 1½ miles northward of Ras Kanzi, may be identified by a rounded hill, about 150 feet ($45^{m}7$) high, which stands about 2 miles westward of the point and is noticeable by its isolation. Vessels from southward and eastward, if bound for Zanzibar, should endeavour to make a landfall at Ras Kimbiji.

Between Ras Kimbiji and Ras Ndege, about 8 miles north-north-westward, the coast consists of white sandy beaches varied by reddish-coloured cliffs at Kutani village, about 3 miles north-north-westward of Ras Kimbiji, where the cliffs are about 70 feet ($21^{m}3$) high, and at Ras Manamku, about 3 miles farther north-north-westward. Ras Ndege is formed of low cliffs, about 10 feet ($3^{m}0$) high, the land close within rising steeply to about 30 feet ($9^{m}1$) high, and being backed by some low rounded hills; Ras Ndege is steep-to and is prominent from either northward or southward.

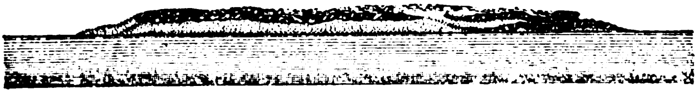
Fungu Miza is a reef, which dries one foot ($0^{m}3$), situated about one mile offshore, about 3 miles north-north-westward of Ras Kimbiji; it lies on the southern end of a narrow coral bank on which there are depths of 3 and 4 fathoms ($5^{m}5$ and $7^{m}3$), and on the northern part of which is a rock with less than 6 feet ($1^{m}8$) over it, on which the sea

Chart 640a.

generally breaks. There are depths of 6 fathoms (11^{m}0), in the channel between Fungu Miza and the coast.

Anchorage.—Except near Fungu Miza, anchorage may be obtained about one mile offshore between Ras Kimbiji and Ras Ndege, in depths of about 14 fathoms (25^{m}6). Caution is necessary, as the depths decrease rapidly from 35 to 15 fathoms (64^{m}0 to 27^{m}4), and again to less than 10 fathoms (18^{m}3), on approaching the coast.

Current.—Northward of the island of Mafia, the western limit of the north-going current does not at times extend beyond midway between the mainland and Fungu Kizimkazi, described below, and, in such conditions a southerly set may be experienced near Ras Kimbiji, even during the south-west monsoon ; usually the current strikes the coast in the vicinity of Ras Kimbiji, and sets northward along the coast.



Fungu Kizimkazi from westward.
(*Original dated* 1884.)

Out-lying danger.—Anchorage.—Landing.—Fungu Kizimkazi or Latham island (*Lat. 6° 54′ S., Long. 39° 56′ E.*), a low, dangerous coral island, lies in the south-eastern approach to the Zanzibar channel, about 23½ miles eastward of Ras Kimbiji. It is 10 feet (3^{m}0) high, and its sandy surface has been flattened by the constant treading of sea fowl into a soft sandstone which shines very white in the sun ; with a bad light, or at night, however, the island is very difficult to distinguish.

The island lies on the western edge of an extensive bank on which the depths are less than 20 fathoms (36^{m}6) and which is steep-to ; a drying reef surrounds the island, and extends about one cable offshore.

The depths on the greater part of Latham bank are from 5 to 10 fathoms (9^{m}1 to 18^{m}3), sand and coral, and so clear is the water, that the bottom has been seen by moonlight when in a depth of 10 fathoms (18^{m}3).

Anchorage may be obtained either northward or southward of the island, depending on the monsoon, but the cross swell on the bank renders the anchorage uneasy.

Except from westward, the island may safely be approached at night with constant sounding.

In moderate weather, landing is practicable on a sandbank which shifts from one side of the island to the other, according to which monsoon is blowing, the sandbank being always on the lee side of the island.

Current.—The current on the bank is variable, but, in the deep water on either side of it, the current sets constantly northward with varying strength ; at 5 miles westward of the island the current becomes much weaker.

Charts 662, 669, 597, 748b, 2483.

CHAPTER IX

RAS NDEGE TO PANGANI BAY, INCLUDING ZANZIBAR ISLAND AND CHANNEL

Charts 664, 669.

ZANZIBAR CHANNEL.—General remarks.—The Zanzibar channel is the channel which separates Zanzibar island from the mainland of Africa. Its southern entrance lies between Ras Ndege (*Lat. 6° 52′ S., Long. 39° 29′ E.*), described on page 348, and Ras Kizimkazi, the southern extreme of Zanzibar island, about 24 miles northward, and its northern entrance lies between Ras Kikogwe (Kikokwe), the southern entrance point to Pangani bay, about 90 miles north-north-westward of Ras Ndege, and Ras Nungwi, the northern extreme of Zanzibar island, about 24 miles south-eastward of Ras Kikogwe. The channel is about 20 miles wide but throughout its length it is studded on either side with numerous coral reefs, which, at one place, reduce the navigable channel to about 4 miles in width.

There is a least depth of 14 fathoms ($25^{m}6$) in the fairway, and, except near the entrances, the depths are everywhere suitable for anchoring, and in an emergency, or if overtaken by thick weather, anchorage may generally be obtained in depths of less than 25 fathoms ($45^{m}7$).

On the western, or mainland, side of the channel, the reefs are at times, not easily distinguished on account of the discoloration caused by the muddy water from the rivers, but on the eastern side, the water is generally clear, so that the reefs can be plainly seen; the positions of the sandbanks on the coral reefs generally change with the monsoons.

In the Zanzibar channel, the great difference between spring and neap ranges, the former being about 13 feet ($4^{m}0$), and the latter about 4 feet ($1^{m}2$), makes a great change in the appearance of the reefs and coasts on both sides of the channel; this is especially noticeable in the case of the large area of coral reefs in the approaches to Zanzibar harbour, and this fact should constantly be borne in mind, and passages new to the navigator should be taken, if possible, at low water.

Current.—Tidal streams.—In the fairway of the Zanzibar channel, the general direction of the current is northward, but amongst the islands and reefs, the direction of the current may be deflected to conform with their shape. The strength of the current varies according to which monsoon is blowing and to the force of that monsoon.

In the southern part of the Zanzibar channel, the tidal stream of the rising tide sets northward, and in the northern part of the channel, it sets southward, the opposing tidal streams meeting at high water

Charts 640a, 640b, 662, 597, 748b, 2483.

Charts 664, 669.

at a point near the centre of the channel, the position of which greatly depends on the direction and strength of the wind. The tidal stream of the falling tide sets in the opposite directions, that is, southward in the southern part of the channel, and northward in the northern part.

In attempting to forecast the resultant of tidal stream and current in any part of the Zanzibar channel, the navigator must take into consideration the age of the moon with its resulting strength of tidal stream, the direction and force of the monsoon, and the contour of the land, with its effect on the direction of the current.

Chart 669.

General directions in approaching from eastward.—During the south-west monsoon, vessels from eastward bound for a port in the Zanzibar channel, should endeavour to make Ras Mkumbi, the northern extreme of the island of Mafia, in preference to Ras Kizimkazi, in order to ensure clearing Fungu Kizimkazi (described on page 349). The northward-going current, although generally strong, is so variable that great caution is necessary.

Ras Mkumbi should be given a berth of at least 3 miles, and from a position northward of it, course may be shaped direct for Ras Kimbiji, with the expectation of making a landfall near the latter point having experienced only a slight northerly set; the coast near Ras Kimbiji is clear of danger and is the highest land in that vicinity, and Ras Kanzi lighthouse is a useful aid. Northward of Ras Kimbiji, the strength of the current increases.

During the north-east monsoon, vessels should be guided by circumstances; the northward-going current is still continuous, and vessels may shape course to make either Ras Kizimkazi or Ras Nungwi (*Lat. 5° 43′ S., Long. 39° 18′ E.*).

Vessels making Ras Nungwi should make allowance for the strong current setting north-north-westward through the channel between Zanzibar and Pemba islands; this constant current runs at rates of from 2 to 4 knots during the south-west monsoon and from one to 2½ knots during the north-east monsoon.

For directions after making Ras Kizimkazi or Ras Nungwi *see* page 378 or page 387.

Chart 640a.

WESTERN SIDE OF ZANZIBAR CHANNEL.—Coast.—Off-lying islands and dangers.—Between Ras Ndege, described on page 348, and Ras Koronjo, a cliffy point about 5 miles west-north-westward, the coast consists of sandy beaches with occasional small cliffs. About 1½ miles westward of Ras Ndege is Dhow harbour, a bight in the fringing reef which affords anchorage for small craft in a depth of 2 fathoms (3^{m}7). During the south-west monsoon, small craft working southward meet the northward-going current off Ras Ndege, which makes it a difficult point to pass, and, at this season, Dhow harbour and the coast westward of it are generally frequented by dhows waiting to get round the point.

Charts 674, 640a.

Mbwamaji (Mboamaji) is a large village situated on the coast about 3½ miles westward of Ras Ndege; a projecting tongue in the coral reef fronting it affords shelter to boats landing at low tide.

Charts 662, 597, 748b, 2483.

Charts 674, 640a.

Between Ras Koronjo and Ras Mjimwema, about 3 miles west-north-westward, is a bay, at the head of which the shore is low and sandy and backed by mangroves. The village of Mjimwema stands close within the head of the bay, and has in it a white house which is noticeable in certain lights. The villages of Mjimpia and Magogoni are situated about 3 cables south-eastward and 6 cables westward, respectively, of Ras Mjimwema, and in the latter village there is also a white house which is prominent in certain lights; all three villages are surrounded by coconut palms.

A drying coral reef fringes Ras Mjimwema and extends about one mile northward; near its north-eastern edge is the island of Kendwa, which has some trees on it and presents a level and uniform outline.

From about 3 miles north-westward of Ras Ndege, the coast is fronted by a chain of islets and reefs which extend for about 22 miles north-westward at between 2 and 4 miles offshore; several of the islets are between 40 and 60 feet ($12^{m}2$ and $18^{m}3$) high, and have trees on them.

Mwamba Kikwero lies about 3 miles north-westward of Ras Ndege and dries 2 feet ($0^{m}6$) in places; it is steep-to, with depths of from 6 to 9 fathoms ($11^{m}0$ to $16^{m}5$) on all sides. Between Mwamba Kikwero and the coast, is a reef which dries one foot ($0^{m}3$), on which the sea always breaks. A 3½-fathom ($6^{m}4$) shoal lies about 7 cables north-north-eastward of Mwamba Kikwero.

Inner Sinda and Outer Sinda are two coral islands which stand on a drying reef, the southern edge of which lies about 1¼ miles northward of Ras Koronjo. There are trees on Outer Sinda and white sand at the northern and southern extremes of Inner Sinda; a chain of small islets stand on the eastern edge of the reef which surrounds the two islands.

Chart 674.

Millard bank (*Lat. 6° 48′ S., Long. 39° 23′ E.*), on which the depths are from 3½ to 5 fathoms ($6^{m}4$ to $9^{m}1$), with a 3-fathom ($5^{m}5$) patch at its northern end, lies about half a mile north-north-westward of Outer Sinda; this bank cannot be distinguished until close to it.

Gunja peak in line with Ras Kankadya, bearing 287°, leads about 1½ miles northward of Millard bank. *See* view on chart 640a.

Mbwamaji harbour.—Anchorage.—Directions.— Mbwamaji harbour lies between the reef which surrounds Inner and Outer Sinda and the coast between Ras Koronjo and Ras Mjimwema and is moderately sheltered, but, when the north-east monsoon is strong, the swell sets in around the reef.

During the south-west monsoon, the best anchorage is in a depth of 10 fathoms ($18^{m}3$), sand and mud, with the south-western sandy extreme of Inner Sinda bearing 141°, and the northern extreme of Outer Sinda bearing 054°. Fair anchorage may also be obtained off the village of Mjimwema, in a depth of 6 fathoms ($11^{m}0$), sand, with the eastern extreme of Kendwa bearing 325° and the white house in the village of Mjimwema, bearing 241°. Small craft, of a draught of 10 feet ($3^{m}0$), may obtain well-sheltered anchorage close off the latter village.

During the north-east monsoon, the best berth is in a depth of 6 fathoms ($11^{m}0$), sand, with the south-western sandy extreme of Inner Sinda bearing 015°, distant about 2 cables. At this anchorage

Chart 674.

the tidal streams are strong, and, after high water, especially during the north-east monsoon, the east-going tidal stream is very strong and swings anchored vessels broadside to the swell.

Vessels approaching Mbwamaji harbour from south-eastward should steer for the island of Inner Makatumbe, described below, bearing about 275° and well open northward of Outer Sinda, until the northern extreme of Inner Sinda is shut in by the southern extreme of Outer Sinda, bearing about 256°. This bearing kept on, passes northward of the 3½-fathom (6^{m}4) patch northward of Mwamba Kikwero, after passing which, course should be shaped to pass about 3 cables off the islets on the eastern edge of the reef which surrounds Inner and Outer Sinda. From this position, the eye will be the best guide to the anchorage.

Vessels from northward should approach the anchorage with the south-western sandy extreme of Inner Sinda bearing less than 168°, which will lead westward of Millard bank.

Islands and reef of Makatumbe.—Light.—Buoy.—Between Ras Mjimwema and Ras Rongoni, about 2 miles west-north-westward, the coast is fronted by a bank on which the depths are less than 3 fathoms (5^{m}5), which extends about 3 miles northward. The northern part of this bank is filled by a drying reef on which stand the islands of Inner and Outer Makatumbe and several islets. The reef is steep-to on its north-eastern side, and on its southern side there is a boat channel across the bank between it and the coast, with a least depth of 1½ fathoms (2^{m}7), but caution is necessary in using this channel as, during the south-west monsoon, the sea sometimes breaks right across it at low water.

Inner Makatumbe, lying at the south-western corner of the reef, about 1½ miles north-eastward of Ras Rongoni, has several trees near its centre and a white house with a flagstaff near its south-western extreme. Outer Makatumbe stands near the north-eastern edge of the reef about half a mile north-eastward of Inner Makatumbe, and Hammond rock, 6 feet (1^{m}8) high, is situated on the northern end of the reef, about a quarter of a mile within the northern extreme of the 3-fathom (5^{m}5) bank.

A light is exhibited, at an elevation of 96 feet (29^{m}3), from a white square tower with black stripes, 95 feet (29^{m}0) in height, situated about 1½ cables eastward of the western extreme of Outer Makatumbe.

A large conical buoy, painted in black and white vertical stripes is moored off the north-western extreme of the 3-fathom (5^{m}5) bank, about 4½ cables north-westward of Hammond rock (*Lat. 6° 47′ S., Long. 39° 20′ E.*).

DAR ES SALAAM AND APPROACHES.—Aspect.—Dar es Salaam, the principal port of Tanganyika Territory, comprises an inner and an outer anchorage. The outer anchorage, Dar es Salaam bay, is entered between the north-western extreme of the reef surrounding Inner and Outer Makatumbe and Ras Kankadya, the northern extreme of a rocky peninsula, situated about 5 miles north-westward of Outer Makatumbe lighthouse, and affords anchorage for a large number of vessels in depths of 7 or 8 fathoms (12^{m}8 or 14^{m}6). The bay is well sheltered during the south-west monsoon, but during the north-east monsoon, a considerable swell sets in with strong winds,

Charts 640a 662, 669, 597, 748b, 2483.

Chart 674.

although small craft may obtain some shelter in the south-eastern part of the bay near Inner Makatumbe.

The inner anchorage, Dar es Salaam harbour, is entered from the southern corner of the bay and is land-locked, with very good holding ground. It is approached through a narrow entrance channel, less than one cable wide in places, and with a least depth of 25 feet (7^{m}6). Within the entrance, the harbour is capable of accommodating 8 to 10 vessels of moderate size, if moored, in depths of from 4 to 8 fathoms (7^{m}3 to 14^{m}6).

The shore of Dar es Salaam bay presents a low outline of sandy beaches and cliffs alternately, and, although much indented, is nearly uniform in height. A chain of mountains, 1,200 to 1,500 feet (365^{m}8 to 457^{m}2) high, stretches south-westward about 12 miles inland, and terminates abruptly. *See* view on chart 640a.

Viewed from north-eastward, the Kankadya peninsula appears as an island, a sandy patch about three-quarters of a mile within Ras Kankadya being prominent during the morning, and, on a closer approach, the Government Hospital, a large, conspicuous two-storeyed building, standing on Ras Chokir, a red cliffy point, 30 feet (9^{m}1) high, situated near the head of the bay about 2¾ miles west-south-westward of Outer Makatumbe lighthouse, will be seen. Government House, situated about 3½ cables south-south-eastward of the hospital is also conspicuous from seaward.

Dangers in approach.—Buoy.—Millard bank and the dangers in the approach from south-eastward, are described on page 352.

Charts 674 and 640a.

For about 10 miles north-westward of Dar es Salaam bay, the coast is fronted by numerous islands and shoals which extend as much as 6 miles offshore in places. The outermost of these shoals are described below and the remainder are described on page 361.

Mbudya patches are a number of small patches, with from 3¾ to 5 fathoms (6^{m}9 to 9^{m}1) over them, lying between 4 and 7 miles northward of Ras Kankadya; the vicinity of these patches should be avoided.

Charts 693 and 674.

Kankadya patch, with a least depth of 5 fathoms (9^{m}1), lies in the northern approach to Dar es Salaam bay about 2¾ miles eastward of Ras Kankadya.

Daphne reefs consist of three groups of reefs lying on the north-western side of the entrance to Dar es Salaam bay; there is a least depth of 2 fathoms (3^{m}7) on the outer group, of 3 fathoms (5^{m}5) on the middle group, and on the inner group, there is a least depth of 1¾ fathoms (3^{m}2).

A buoy, painted in red and white horizontal bands, is moored at the south-eastern extreme of the outer group of Daphne reefs.

The western tangents of Bongoyo, an island lying about 1½ miles northward of Ras Kankadya, in one, and bearing 312°, leads north-eastward of the outer Daphne reef, and Gunja peak in line with Ras Kankadya, bearing 287°, also leads north-eastward of Daphne reefs.

Western and southern shores of Dar es Salaam bay.—Lights.—From Ras Kankadya (*Lat. 6° 44′ S., Long. 39° 16′ E.*), the western shore of the bay trends southward for about 3¼ miles to Msimbasi

Charts 693 and 674.

bay, and consists of cliffs, of from 10 to 20 feet ($3^{m}0$ to $6^{m}1$) high, fringed by a narrow reef and shore bank which extends 3 cables offshore in places. Mto Upanga flows into the head of Msimbasi bay, which is sandy and is entered between cliffy points ; Ras Upanga, its southern entrance point, lies about 4 miles southward of Ras Kankadya.

From Ras Upanga, the coast trends south-eastward for about 1½ miles to West Ferry point, the north-western entrance point to Dar es Salaam harbour. East Ferry point, the south-eastern entrance point to the harbour, lies about 2 cables eastward of West Ferry point, whence the coast trends east-north-eastward for about 8 cables to Ras Rongoni, a rocky point with red cliffs, 15 to 20 feet ($4^{m}6$ to $6^{m}1$) high ; an obelisk, painted green, stands on Ras Rongoni.

Between Ras Upanga and Ras Rongoni, the coast is fringed with a drying reef which extends over one mile north-eastward of West Ferry point ; a narrow channel through this reef leads into Dar es Salaam harbour, the channel being entered between North reef, about 3 cables north-westward of Ras Rongoni (*Lat. 6° 49′ S., Long. 39° 19′ E.*), and South reef, about 2 cables south-eastward of North reef.

The entrance to the channel is approached between the eastern edge of a 3-fathom ($5^{m}5$) bank which fronts the fringing reef between Ras Upanga and Ras Rongoni, and the western edge of the extensive bank which forms the eastern side of Dar es Salaam bay, on the outer part of which stands the reef surrounding Inner and Outer Makatumbe.

Charts 693.

Leading lights are established at Kidandoni on the western side of the bay. The front light is exhibited, at an elevation of 48 feet ($14^{m}6$), from a white, framework, iron structure, situated on the coast about 8 cables northward of Ras Upanga. The rear light is exhibited, at an elevation of 62 feet ($18^{m}9$), from a white iron framework beacon with a red vertical central stripe, 40 feet ($12^{m}2$) in height, situated about 2½ cables west-south-westward of the front light. These lights, when in line and bearing 247° lead into Dar es Salaam bay between Daphne reefs and the north-western extreme of the reef surrounding Inner and Outer Makatumbe.

Leading lights are established for the approach to the harbour entrance channel. The front light is exhibited, at an elevation of 28 feet ($8^{m}5$), from a white framework beacon, 40 feet ($12^{m}2$) in height, situated on the reef about 1¼ cables west-north-westward of Ras Rongoni. The rear light is exhibited, at an elevation of 39 feet ($11^{m}9$), from a white obelisk, 24 feet ($7^{m}3$) in height, situated about 1½ cables southward of the front light. These lights, when in line and bearing 193°, lead in the fairway of the approach to the entrance channel.

Entrance channel.—Harbour.—Dangers.—The entrance channel is about 1¼ miles in length from its outer entrance between the edges of the banks fronting North and South reefs, to the harbour entrance southward of West Ferry point ; its width varies from about 1½ cables to about half a cable at its narrowest part between East and West Ferry points. Owing to the sharp bends in the channel, it is inadvisable to attempt the passage in a single-screw vessel of over 550 feet

Chart 693.

($167^{m}6$) in length. Twin or multiple-screw vessels of 600 feet ($182^{m}9$) in length can safely navigate the channel; vessels of greater length may navigate the channel with the permission of the Port authorities. The shoalest parts are in the approach, close northward of the entrance, and on a bar situated about 4¾ cables north-eastward of West Ferry point (*Lat. 6° 50′ S., Long. 39° 18′ E.*), where there are least depths of 25 feet ($7^{m}6$).

East and West Ferry points are low and sandy, but within the harbour the shores are chiefly low cliffs and steep banks, about 20 to 30 feet ($6^{m}1$ to $9^{m}1$) high, fringed by mangroves. From West Ferry point, the northern shore of the harbour trends west-south-westward for about three-quarters of a mile and forms a bight at the head of which stands the town of Dar es Salaam. Conspicuous buildings in the town are the Roman Catholic cathedral, with a sharp spire, situated about 7½ cables west-north-westward of West Ferry point, and the Lutheran church, which has a red roof and a square white tower, situated about half a mile west-north-westward of West Ferry point. The officers' mess at Kurasini, a cream-coloured building with a red roof about 6 cables southward of the Roman Catholic cathedral is also conspicuous.

Mto Kurasini flows into the western side of the harbour close southward of the town and immediately opposite the harbour entrance; the depths at the mouth of Mto Kurasini are less than 2 fathoms ($3^{m}7$), and it is spanned by a bridge close within its entrance.

Southward of the mouth of Mto Kurasini, the harbour trends south-eastward, and there is a small dockyard situated about 3 cables south-eastward of its entrance.

From East Ferry point, the south-eastern shore of the harbour trends south-westward for about 5 cables to Ras Makabe, whence it turns sharply, and trends south-south-eastward, forming the eastern side of an inlet which is navigable for about 2 miles. A conspicuous black and white flagstaff, with a wind sock, stands close eastward of Ras Makabe. About 2½ miles southward of Ras Makabe the inlet divides into two branches, and both branches end in mangrove swamps close above the fork.

The edges of the reefs which form the sides of the entrance channel are fringed by a 3-fathom ($5^{m}5$) bank, which extends over half a cable from them in places; a sunken dock lies on the edge of the fringing bank, nearly half a cable northward of East Ferry point (*Lat. 6° 50′ S., Long. 39° 18′ E.*).

A bank on which the depths are less than 2 fathoms ($3^{m}7$), fronts the shore of the harbour between East Ferry point and Ras Makabe, and extends as much as one cable offshore for a distance of 4 cables eastward of the latter point.

Centre shoal, with depths of from 25 to 36 feet ($7^{m}6$ to $11^{m}0$) over it, lies in the northern part of the harbour, about 1¾ cables north-westward of Ras Makabe.

Lights.—Beacons.—Bollard.—Buoyage.—The fairway of the entrance channel is marked as follows:—

The leading light-structures at Ras Rongoni are described above.

No. 1 black spar buoy is moored on the western side of the approach to the channel, about 9 cables northward of Ras Rongoni (*Lat. 6° 49′ S., Long. 39° 19′ E.*).

Charts 674, 640a, 662, 669, 597, 748b, 2483.

Chart 693.

No. 2 can buoy, painted in red and white chequers, is moored on the eastern side of the approach to the channel, about 7½ cables northward of Ras Rongoni; this buoy marks the north-western side of a 12-foot ($3^{m}7$) shoal, known as Makatumbe patch.

No. 4 can buoy, painted in red and white chequers, is moored on the eastern side of the entrance to the channel, about 3¾ cables northward of Ras Rongoni.

A light is exhibited, at an elevation of 8 feet ($2^{m}4$), from a black framework beacon, 24 feet ($7^{m}3$) in height, situated on the north-western side of the channel, about 3 cables north-north-westward of Ras Rongoni.

No. 3 black conical buoy is moored on the northern side of the channel, about 5¾ cables north-eastward of West Ferry point.

Leading lights are established near Ras Makabe. The front light is exhibited from a prominent white framework beacon, situated close offshore about 2 cables east-north-eastward of Ras Makabe. The rear light is exhibited, from a similar beacon, about three-quarters of a cable south-westward of the front beacon. These lights, when in line and bearing 216°, lead through the harbour entrance between East and West Ferry points.

No. 5 black conical light-buoy, exhibiting a *green fixed* light, is moored on the western side of the channel, about one cable north-eastward of West Ferry point.

There are several pairs of beacons, painted white or red and white, around the shores of the harbour, which are used as transit marks for berthing vessels.

A bollard, to which large vessels may secure their sterns, when anchored, exists about 2 cables north-westward of West Ferry point; the bollard is situated midway between the alignments of the first two pairs of beacons used as transit marks for berthing vessels.

Three conical light-buoys, Nos. 6, 8 and 10, painted in red and white chequers, and each exhibiting a *red fixed* light, are moored 1½ cables north-eastward, one cable northward and three-quarters of a cable north-westward respectively, of the western extremity of Ras Makabe.

Pilotage.—Signal station.—Traffic signals.—Pilotage is compulsory, except for merchant vessels under 200 tons, southward of a line running westward from Outer Makatumbe lighthouse; on making the usual signals, the pilot boat should be found waiting in the vicinity.

A conspicuous signal station, with a tower, a flagstaff and a red roof, stands on East Ferry point (*Lat. 6° 50′ S., Long. 39° 18′ E.*).

The following signals are displayed from the signal station:—

Signal.	*Meaning.*
A black flag at the masthead by day. 3 *red* lights disposed vertically by night.	Entry prohibited.
A black ball by day. 3 lights, *white, red, white* disposed vertically by night.	Departure prohibited.

Distant signal.	*Meaning.*
Black square on a white background.	Entry prohibited.
White ball on black background.	Departure prohibited.

Tidal streams.—Caution.—In the approaches to Dar es Salaam

Charts 674, 640a, 662, 669, 597, 748b, 2483.

Chart 693.

bay (*Lat. 6° 48′ S., Long. 39° 19′ E.*) general direction of the tidal stream of the rising tide is north-westward, and of the falling tide, south-eastward, but amongst the off-lying islands and reefs, these directions are often reversed.

As stated on page 351, the direction and force of the monsoons have a considerable effect on the currents, and the resultant movement of water, caused by a combination of current and tidal stream, is therefore very variable and uncertain.

In the entrance channel, the tidal streams are strong during springs, especially near low water, as at that time, movement of tidal streams is confined to the channel itself, and is generally strongest about 2 hours after low water. The out-going tidal stream sets directly across the entrance towards Inner Makatumbe, and caution is also necessary when the North reef is covered, as, at such times, the tidal stream sets across the reef.

The in-going stream flows until about the time of high water, but the occurrence of this slack water varies very considerably with astronomical and meteorological conditions. During the rainy season, the duration of the in-going stream is reduced and that of the out-going stream correspondingly increased. At neaps during this season the in-going stream may be scarcely perceptible at the surface.

The advice of the Port Captain should be sought with regard to the times of slack water on any particular day.

Charts 693, 674.

Anchorages.—Directions.—The best anchorage for vessels of moderate draught during either monsoon is in a depth of 4 fathoms ($7^{m}3$), mud, with the quarantine station on Inner Makatumbe bearing 127°, and Hammond rock, bearing 048°. Vessels of light draught may with advantage anchor closer to Inner Makatumbe, but vessels of deep draught must anchor farther northward, in depths of 7 or 8 fathoms ($12^{m}8$ to $14^{m}6$).

Anchorage in any part of the entrance channel, between the outer buoys and West Ferry point, is only allowed in case of absolute necessity.

Within the harbour, vessels are anchored in allotted berths by pilots.

An anchorage for dhows, marked by beacons and buoys, exists about 7 cables southward of Ras Makabe. The limits of the anchorage are shown on the chart.

Vessels from south-eastward should steer to pass about 2½ miles northward of Outer Sinda, by keeping Gunja peak in line with Ras Kankadya, bearing 287°, *see* view on chart 640a, which line passes about 1½ miles northward of Millard bank (*Lat. 6° 48′ S., Long. 39° 23′ E.*). Keep this mark on until Kidandoni light-structures are in line, bearing 247°, when they should be steered for on that bearing until Ras Rongoni light-structures are in line, bearing 193° when the latter should be steered for on that bearing, and if anchoring in the bay, course may be shaped for the selected anchorage when Outer Makatumbe lighthouse bears 118°.

Should Kidandoni light-structures not be distinguishable, vessels should continue on a course of 287° until the north-western tower of the Government Hospital on Ras Chokir is in line with the red tower of the Lutheran church bearing about 216°, when it should

Charts 640a, 662, 669, 597, 748b, 2483.

Charts 693, 674.

be steered for on that bearing until Ras Rongoni light-structures come in line, when the directions given above should be followed.

Vessels from northward should avoid Mbudya patches and Kankadya patch by approaching Outer Makatumbe lighthouse on a bearing of not less than 180°, until Kidandoni light-structures are in line, when the directions given above should be followed.

Vessels entering or leaving harbour during the period of spring tides must do so stemming the tidal stream.

At neaps, vessels may safely use the channel at any time, irrespective of the state of the tide.

Vessels proceeding into the harbour should approach with the light-structures at Ras Rongoni in line, bearing 193°, and should keep on this line until nearly abreast No. 4 buoy, when course should be altered slightly westward and shaped to round North Reef light-beacon at a distance of about half a cable, whence a mid-channel course should be maintained until Ras Makabe light-structures are in line, bearing 216°, when they should be steered for on that bearing until abreast West Ferry point, when course may be altered westward, to pass northward of the light-buoys marking the edge of the bank which fringes Ras Makabe.

As stated above, the out-going tidal stream sets across the entrance to the channel towards Inner Makatumbe, and great care is therefore necessary, more especially by an outward bound vessel, to keep on the line of Ras Rongoni light-structures (*Lat. 6° 49′ S., Long. 39° 19′ E.*).

Port facilities.—A pier projects about 120 feet (36^{m}6) south-westward from the western side of West Ferry point; this pier is the landing place for Government House.

The passenger landing pier projects about 150 feet (45^{m}7) from the shore abreast the Roman Catholic cathedral, and at its outer end is a pontoon 50 feet (15^{m}2) in length, with a depth alongside of 12 feet (3^{m}7). All persons must land at this pier, at the root of which is the Custom House. Boats are not allowed to make fast to piers nor to lie alongside for any length of time.

South-westward of the passenger pier are wharves for lighters, of which there are a large number in the port.

There are several cranes at the lighter wharves, the largest having a lifting capacity of 20 tons.

In 1953, reclamation work and new construction was in progress for a distance of 2,000 feet (609^{m}6) south-eastward of Mto Kurasini.

An oil pier, 300 feet (91^{m}4) in length, with a **T** head of 50 feet (15^{m}2), is situated about 4 cables south-south-westward of Ras Makabe.

A jetty for dhows, constructed of stone and wood, 315 feet (96^{m}0) in length with a **T** head of 130 feet (39^{m}6) is situated about 5 cables southward of Ras Makabe (*Lat. 6° 50′ S., Long. 39° 18′ E.*).

There are four small tugs in the port, but these are of low power.

Moderate engineering repairs can be carried out by the Government Railway and Harbour workshops.

There are several small slipways, the largest of which can take a vessel of 100 tons and not exceeding 150 feet (45^{m}7) in length.

A moderate supply of coal is stocked for the use of local Government vessels. Coal is embarked from lighters.

A small quantity of diesel oil is maintained for local use.

Charts 640a, 662, 669, 597, 748b, 2483.

Charts 693, 674.

Fair quantities of fresh provisions are obtainable, but prior notice is desirable.

Water can only be obtained in small quantities in case of emergency.

Town.—Dar es Salaam is the seat of Government and the residence of the Governor of Tanganyika Territory, and has many official and public buildings. The town is elevated about 20 feet ($6^{m}1$) above the harbour, from which several flights of steps lead to it.

There are two hospitals, that for Europeans being situated on Ras Chokir and having a moderate number of beds.

In 1952, the population of Dar es Salaam was 99,140 including 3,603 Europeans and 72,330 Africans.

During the year 1951, 425,302 tons of cargo were landed and 218,183 tons cleared at Dar es Salaam.

Communications.—There is regular communication by sea with Europe, India, and other East and South African ports.

Dar es Salaam is the terminus of the Tanganyika Territory Central railway, which runs to Mwanza on Lake Victoria and to Kigoma on Lake Tanganyika.

Dar es Salaam is connected to the general telegraphic system and has cable communication with Europe, South Africa and the Orient.

There is regular air service with Europe and South Africa, and also with Zanzibar, the island of Mafia and other East African ports.

There is a radio station at Dar es Salaam, *see* page 35.

Climatic table.—*See* page 76.

Charts 674, 640a.

WESTERN SIDE OF ZANZIBAR CHANNEL (continued).—**Coast.**—Between Ras Kankadya (*Lat. 6° 44′ S., Long. 39° 16′ E.*) and Ras Kiromoni, about 8 miles north-westward, the coast is chiefly sandy and is indented by creeks leading to mangrove swamps, and is backed about 3 miles inland by a long thickly, wooded and featureless range of hills, at the northern end of which is Gunja peak, 600 feet ($182^{m}9$) high. This stretch of coast is fronted by numerous islands and shoals, which extend as much as 6 miles offshore, and afford shelter to several anchorages.

Chart 674.

Between the Kankadya peninsula and the mouth of Mto Peremji, about 5 miles north-westward, the coast forms a bight known as Msasana (Msasani) bay; the northern entrance point to Mto Peremji is a rounded point on which stands the village of Kunduchi (Konduchi), and, as the trees surrounding the village are higher than others in the immediate vicinity, the point is moderately noticeable from northward.

Msasana bay.—Anchorages.—Msasana bay is entered from eastward between Ras Kankadya and the south-eastern extreme of Bongoyo, about 1¼ miles northward. Bongoyo is a rocky island which presents a uniform outline of stunted trees on cliffs about 40 feet ($12^{m}2$) high; it is uninhabited, and its undergrowth is almost impenetrable. There is an isolated rock, 8 feet ($2^{m}4$) high, known as North islet, close off its northern extreme and a sandy bay in the centre of its north-eastern side, shows white and distinctive during the morning. Southward of the sandy bay, the reef extends as much as 5 cables from the island. A rock, with less than 6 feet

Charts 664, 662, 669, 597, 748b, 2483.

Chart 674.

($1^{m}8$), which breaks occasionally, lies on the 3 fathom ($5^{m}5$) line about 6 cables east-south-eastward of the south-eastern extremity of the island.

Msasana bay is sheltered from swell by Bongoyo and its surrounding reef, and good anchorage may be obtained in it during either monsoon. The head of the bay is very shoal, and a drying sandbank extends about 6 cables offshore. Some rocks awash, the exact positions of which are uncertain, lie about 11 cables south-eastward of Ras Kankadya, near the edge of a 3-fathom ($5^{m}5$) bank which fronts the drying sandbank; vessels should keep in depths of more than 5 fathoms ($9^{m}1$) in this vicinity.

During the north-east monsoon, the best berth is in a depth of 8 fathoms ($14^{m}6$), sand, westward of the centre of Bongoyo, with the north-western extreme of that island bearing about 348°, distant about three-quarters of a mile.

During the south-west monsoon, vessels are recommended to anchor farther northward, about 6 cables westward of the north-western extreme of the island, or, if preferred, anchorage may be obtained in the southern part of the bay, in a depth of about 6 fathoms ($11^{m}0$), with Ras Kankadya bearing 086°, distant about 7 cables. From the latter berth, landing may be easily effected at the village of Msasana at the south-western corner of the bay, whence to Dar es Salaam, is about a 2 hours' walk.

Access to Msasana bay is safe and easy from eastward. Vessels should approach with Gunja peak midway between Ras Kankadya and Bongoyo (*Lat. 6° 42′ S., Long. 39° 16′ E.*), bearing about 282° and should keep on this line until the high trees on Inner Makatumbe are shut in by Ras Kankadya, when course may be shaped for the selected anchorage.

Off-lying islands and dangers.—Anchorages.—Beacon.— Mbudya is an island lying about 4½ miles north-north-westward of Ras Kankadya and about 2 miles from the coast abreast the village of Kunduchi. It is formed of coral and faced with low cliffs, and had, in 1874, a square clump of trees 60 feet ($18^{m}3$) high, showing above the other vegetation; it is occasionally frequented by fishermen.

The island stands on the north-western part of an extensive drying coral reef, the western side of which is moderately steep-to, but the eastern side has numerous off-lying patches and is dangerous to approach. The northern side of the reef, although not steep-to, can generally be distinguished by the eye.

Mbudya spit, with a least depth of 3 fathoms ($5^{m}5$), extends from the south-eastern part of the reef, its extreme lying about 2 miles south-eastward of Mbudya; a very narrow 2¾-fathom ($5^{m}0$) shoal lies about half a mile eastward of Mbudya spit.

Mbudya patches, about 3 miles eastward of Mbudya, are described on page 354.

Pangavini is a rocky islet, standing on the northern part of a drying coral reef, about one mile south-westward of Mbudya. A 3-fathom ($5^{m}5$) shoal lies about three-quarters of a mile northward of Pangavini and there is a narrow channel, with a depth of 7 fathoms ($12^{m}8$) between the islet and the coast.

The channel between Mbudya and Pangavini is known as Kunduchi (Konduchi) harbour and affords temporary anchorage during the

Charts 640a, 664, 662, 669, 597, 748b, 2483.

Chart 674.

north-east monsoon, although the anchorage in Msasana bay is preferable. The best berth is in about 10 fathoms (18^m3), sand, about midway between Mbudya and Pangavini.

Kunduchi harbour may be approached from northward or southward, the latter being the better entrance during the north-east monsoon. Vessels approaching from south-eastward should keep the northern extreme of Bongoyo bearing about 273°, and when the south-eastern extreme of that island bears 204°, should bring Pangavini slightly on the port bow and should shape course for the anchorage keeping a good look out for the southern side of the reef surrounding Mbudya (*Lat. 5° 40′ S., Long. 39° 15′ E.*).

As there are no good leading marks for the northern entrance, which is a narrow channel between Mbudya and the 3-fathom (5^m5) shoal northward of Pangavini, this entrance should only be used by vessels of a draught of not more than 18 feet (5^m5). Such vessels may enter safely by giving the western extreme of Mbudya a berth of 4 cables.

Fungu Mkadya is a coral reef, which dries 2 feet (0^m6) situated about one mile north-westward of Mbudya. There is a clear channel, about 6 cables wide and with depths of 10 fathoms (18^m3), between Mbudya and Fungu Mkadya, but the eye is the only guide. There are depths of 5 to 7 fathoms (9^m1 to 12^m8) in the channel between Fungu Mkadya and the coast.

During the south-west monsoon, good anchorage may be obtained between Mbudya and Fungu Mkadya, about half a mile westward of the former, in depths of 11 fathoms (20^m1), sand, with a small sandy spit on the western extreme of Mbudya bearing 121°, and the north-western extremity of Pangavini bearing 182°.

Fungu Yasin is an extensive drying coral reef, with a sandy islet situated on its north-western extreme, about 4 miles north-north-westward of Mbudya. The northern and western sides of Fungu Yasin are steep-to, but a bank on which the depths are from 4 to 5 fathoms (7^m3 to 9^m1), extends about one mile south-eastward of the reef and has a 3-fathom (5^m5) patch near its extreme.

A beacon, painted in red and white and surrounded by a triangle, stands on the sandy islet on Fungu Yasin (*Lat. 6° 36′ S., Long. 39° 13′ E.*).

During either monsoon, good anchorage may be obtained westward of Fungu Yasin, in depths of 16 fathoms (29^m3), with the beacon bearing about 031°, distant 5 cables. The safer approach is northward of the reef.

Coast.—Off-lying dangers.—Anchorage.—Between Ras Kiromoni and Ras Mbegani, a low mangrove point about 17 miles north-westward, the coast is low and generally sandy and is fringed by drying sandbanks or coral reefs, which extend between 3 and 9 cables off-shore, and is backed by mangrove swamps or dense bush. A few miles inland are low, rounded, wooded hills, about 300 feet (91^m4) high. Several villages are situated along this stretch of coast, and at the village of Mbweni, about 4½ miles north-westward of Ras Kiromoni, are some large mangrove trees and some white tombs which are prominent.

Near the village of Waso, about 5 miles east-south-eastward of Ras Mbegani, a long narrow tongue of coral and sand, which is covered with thick bush, extends westward parallel with the coast for about

Charts 640a, 664, 662, 669, 597, 748b, 2483.

Chart 674.

4 miles, and terminates at Ras Lwale (Luale), a low point about one mile eastward of Ras Mbegani. The lagoon thus formed is known as Mwangotini lagoon, and mostly dries at low water, but there are narrow channels leading to the villages of Mbegani and Mwangotini on its southern side; the position of the latter village is marked by tall coconut palms and white tombs.

A rock, with a depth of less than 6 feet (1^m8) over it, lies about one mile north-north-westward of Ras Kiromoni, and about one mile farther northward is Ukatani, a reef with a depth of less than 6 feet (1^m8) on its outer portion, which lies about 1½ miles from the coast abreast the village of Ukatani.

The reefs of Mbweni are two patches, lying about 2 miles from the coast abreast the village of Mbweni, about 2¾ and 4 miles, respectively, north-westward of the beacon on Fungu Yasin; there is a least depth of 2 fathoms (3^m7) on the south-eastern patch, and of less than 6 feet (1^m8) on the north-western patch. Both patches are difficult to distinguish as the water is thick and the sea seldom breaks over them.

The reefs of Kitapumbe are two drying coral reefs, situated about 2½ miles from the coast abreast the village of Kitapumbe, about 7 and 9 miles, respectively, north-westward of the beacon on Fungu Yasin. A shoal, with a least depth of 2 fathoms (3^m7), lies about one mile south-south-eastward of the south-eastern reef. The reefs of Kitapumbe are moderately steep-to and the sea generally breaks on them, but the water in the vicinity is thick.

Mshingwi (*Lat. 6° 27′ S., Long. 39° 01′ E.*) is a small coral reef, which dries 11 feet (3^m4), situated about 2½ miles east-north-eastward of Ras Lwale; it is steep-to, with depths of 9 fathoms (16^m5) close around it, and the sea always breaks on it when covered.

Moderately good anchorage, especially during the south-west monsoon, may be obtained between Mshingwi and the coast, in a depth of 9 fathoms (16^m5), mud; the coast here is steep-to, and may be closely approached with safety. The western side of Mshingwi is the better side to pass when proceeding to the anchorage.

Bagamoyo roadstead.—Danger.—Between Ras Mbegani and Ras Nunge, a mangrove point which projects well out from the coast about 5 miles north-westward is a sandy bay, at the head of which about 2 miles southward of Ras Nunge, stands the town of Bagamoyo. Bagamoyo roadstead fronts the bay, but, owing to the shoal depths, the anchorage lies some distance offshore.

The most conspicuous object in the town is a long white building with a red roof and a tower at each end, situated in the southern part of the town, about 2¼ miles southward of Ras Nunge. The houses of the French mission are hidden in a dense grove of casuarina trees, nearly one mile north-westward of the conspicuous house in the town; the grove is easy to identify and makes a good mark from seaward. The village of Kaole, almost obscured from seaward, by trees, lies about 1¼ miles westward of Ras Mbegani.

A bank, on which the depths are less than 3 fathoms (5^m5), the inner part of which dries, fronts the coast between Ras Mbegani and Ras Nunge, and extends as much as 2¾ miles offshore. Kebandahodi, a large bank of sand and mud, awash, lies on the north-eastern part of the above bank, leaving only a narrow boat channel, with depths

Charts 640a, 664, 669, 597, 748b, 2483.

Chart 674.

of 2 fathoms (3^{m}7), about one mile northward of Ras Mbegani. The sea generally breaks on the northern part of Kebandahodi, but if not breaking, the bank can seldom be distinguished as the water is thick and muddy.

Off-lying danger.—Beacon.—Mbwakuni is a drying reef which lies about 5½ miles north-eastward of Bagamoyo in the direct track from Zanzibar harbour; it is steep-to, with depths of from 6 to 9 fathoms (11^{m}0 to 16^{m}5) close around it. Several patches on the reef dry at half tide, and on its western end is a sandbank, which dries 11 feet (3^{m}4), over which, when covered, the sea usually breaks.

A beacon, consisting of a tripod, 18 feet (5^{m}5) high, stands on the eastern extreme of Mbwakuni.

Anchorage.—Buoy.—Directions.—There is a heavy swell at the roadstead during both monsoons, rendering anchorage uneasy in shoal depths. Vessels of moderate draught should anchor in a depth of 5 fathoms (9^{m}1).

A black conical buoy, is moored southward of the anchorage, about one mile east-south-eastward of Ras Nunge.

Vessels from south-eastward should steer to pass not more than one mile southward of Mbwakuni, until the grove of trees surrounding the mission bears 225°, when it may be steered for on that bearing.

Vessels from northward or from Zanzibar harbour should steer to pass about one mile north-westward of Mbwakuni (*Lat. 6° 22′ S., Long. 39° 00′ E.*), and when the grove of trees surrounding the mission bears 220°, should steer for it on that bearing.

Vessels leaving Bagamoyo and bound for Zanzibar harbour may, in clear weather, pass westward of Mbwakuni and between Tambare and Boribu *see* pages 376 and 377, but in thick weather, especially during the south-west monsoon when the currents are strong, vessels are advised to pass within 1½ miles eastward of Mbwakuni, and then to steer to pass eastward of Boribu, keeping a sharp lookout for the latter reef and giving it a wide berth.

Landing.—At low water, the sandbank fronting the shore dries as much as one mile offshore, and dhows are grounded on this bank and unloaded when it dries. During either monsoon, the best landing place is abreast the northern end of the town, nearly opposite the grove of trees surrounding the mission. In this position, at low water there is a cove in which the water is generally smooth, which is formed by a coral ridge running parallel with the shore and ending abruptly at the sandbank fronting the town; this ridge, although covered at high water, breaks the swell.

Town.—The town of Bagamoyo stands a few feet above sea level on a low steep bank, and consists of stone houses alternating with palm huts. Supplies of fresh provisions are usually obtainable.

Communications.—Bagamoyo is connected to the general telegraphic system.

Mto Ruvu.—Mto Ruvu or Kingoni (Kingani) enters the sea about 3 miles west-north-westward of Ras Nunge. The lower part of the river is known as Kingoni, but from about 15 miles above its mouth it is called Mto Ruvu; it follows an extremely tortuous course, its general direction being from south-south-westward.

The entrance is fronted by an extensive drying bar, which extends over 3 miles northward of Ras Nunge; the bar is of a shifting nature,

Charts 640a, 664, 669, 597, 748b, 2483.

the depths being variable, and the sea generally breaks heavily on its outer edge.

During either monsoon, the best approach to the entrance is close to the mangrove-covered coast westward of Ras Nunge, and inside a mangrove islet close off the south-eastern entrance point of the river; at the date of the survey, in 1874, there was a least depth of 5 feet (1^m5) in this passage at three-quarters flood tide, and the smoothness of the water made it the safest approach. Greater depths are found farther offshore, but there are innumerable snags which are dangerous to boats. In calm weather, there is also a good passage close to the north-western coast of the approach to the entrance, but no heavily-laden boat should attempt to enter or leave the river when the out-going tidal stream has been running for one hour.

The entrance is 6 cables wide between dense mangroves, and has depths of 2 fathoms (3^m7); within the entrance, the river runs between mangroves and is about half a cable wide for about 12 miles, but is so tortuous, that this point is only 5 miles in a direct line from its mouth. Above this point, the river runs through cultivated and open country, and in 1874, was ascended by boat from H.M.S. *Shearwater* as far as Dunga, a village about 35 miles above the entrance by river, but only 15 miles in a direct line.

The river is crossed by a ferry (*Lat. 6° 24′ S., Long. 38° 51′ E.*) about half a mile above its mouth, and there is also a ferry at Kingwere, about 19 miles higher up; the tidal stream is felt for a short distance above Kingwere.

At Dunga, the river is about 18 yards (16^m5) wide and it is stated that it maintains this width for many miles farther. It is reported that any sojourn on the banks of Mto Ruvu is generally followed by fever.

Coast.—Off-lying dangers.—Buoy.—Between Ras Nunge and the northern entrance point to Mto Kingoni, about 3 miles north-westward, the coast is a mangrove swamp, thence for about 9 miles northward to Ras Winde (Windi) the mangroves continue but are fringed by a strip of sand; there are a few small villages on this stretch of coast, the positions of which are indicated by clumps of coconut palms.

Ras Winde is a sandy point which may be identified by a small but conspicuous clump of trees which, in 1904, stood close north-westward of it; the village of Winde situated on the coast about 2 miles southward of Ras Winde, may be identified from seaward by some white tombstones.

Within the coast, an extensive low plain stretches for many miles westward, and during the rainy season, is completely inundated, Kungwe, a mountain, 5,807 feet (1770^m0) high, situated some distance inland within the plain, is visible from a considerable distance, and, having two summits, it has been mistaken for Mount Genda Genda, described on page 368, by vessels in doubt of their position.

The above stretch of coast is fronted by a bank on which the depths are less than 3 fathoms (5^m5), the inner part of which dries, and which extends as much as 3 miles offshore in places; a coral ledge, which dries 6 feet (1^m8), on which the sea breaks heavily, lies near the edge of the above bank, about one mile eastward of Ras Winde.

Fungu Miko are two reefs, on which the sea generally breaks, lying between 6 and 7 miles east-south-eastward of Ras Winde. The

Chart 674.

southern reef dries 6 feet (1^m8), and the northern, which is composed of broken heaped-up coral, dries 8 feet (2^m4). Both reefs are steep-to, depths of 12 fathoms (21^m9) being found close around them.

Winde patches are two flat coral reefs on which the sea generally breaks, situated about 3½ and 4 miles, respectively, eastward of Ras Winde. The southern reef dries 6 feet (1^m8), and is steep-to, with depths of 7 and 8 fathoms (12^m8 and 14^m6) around it; the northern reef dries 4 feet (1^m2), with depths of 10 to 12 fathoms (18^m3 to 21^m9) around it.

A white spar buoy, marked "Winde" in black letters, and surmounted by two triangles, points together, is moored westward of the southern Winde patch.

About 3½ miles northward of Ras Winde is Ras Utondwe (*Lat. 6° 10′ S., Long. 38° 52′ E.*), a low sandy spit which forms the southern side of a small bay at the head of which is Mto Utondwe, a salt water creek which resembles a river but which ends in a mangrove swamp about 2½ miles above its mouth. From northward, Ras Utondwe may be identified by its light-coloured sand, which may be seen fronting the conspicuous clump of trees at Ras Winde from a distance of 10 miles.

About 17 miles westward of Ras Utondwe is Udoe hill, about 800 feet (243^m8) high, which has the appearance of a flat range which slopes steeply to a broad valley on its southern side; this hill is not shown on the chart.

Chart 640b.

Mto Wami.—Mto Wami enters the sea through two mouths, the Chunango mouth being about 2 miles north-westward of Ras Utondwe, and the Purahanya mouth, the principal one, about one mile farther north-westward. Both mouths are difficult to identify owing to the mangroves at their entrances and to the fact that they both take abrupt turns close within their entrances, but the southern fall of Udoe hill, bearing about 255°, leads to the Purahanya mouth.

Both mouths have changing bars which vary with the season, and which dry across at low water, springs, so that it is difficult for boats to enter them after half tide. The Chunango branch comes to an abrupt end about 3 miles within its mouth; a little below this point, a narrow and tortuous channel, which dries, leads to the Purahanya branch.

Within its bar, the Purahanya branch is about 80 yards (73^m2) wide, with depths of about 2 fathoms (3^m7), but at the fork of the channel leading to the Chunanga branch, about 2 miles above the entrance, it is only 20 yards (18^m3) wide at low water, and small power-boats cannot proceed more than one mile above this point; rowing boats will find difficulty at low water at a point about 2½ miles above the fork, but the river deepens and improves higher up. Cultivated and open country is reached about 7 miles above the entrance, below this, the country is all mangrove swamp.

Coast.—Off-lying dangers.—Buoy.—Between the entrance to the Purahanya branch and Ras Machuisi, about 11 miles northward, the coast forms a slight bight and is low and sandy, with mangroves fringing the mouths of the numerous rivers and creeks which enter the sea between these points. Ras Machuisi only projects slightly, but may be identified by a dense grove of trees on it, which is

Charts 640a, 664, 669, 597, 748b, 2483.

noticeable from northward or southward; the village of Buiuni is situated on the coast about one mile northward of Ras Machuisi.

Sadani (Saadani), a large village of low mud huts, situated about 7 miles south-south-westward of Ras Machuisi, is the principal village in this vicinity. The Custom House, a low building with two roofs, is just visible from seaward, between trees; southward of the village is a peculiar-shaped hill which, when seen from a distance, resembles a house. Sadani is connected to the general telegraphic system, and fresh provisions may be obtained there. There are numerous smaller villages on the coast northward of Sadani.

A 3-fathom ($5^{m}5$) bank, the inner part of which dries, fronts the coast between Ras Utondwe and Ras Machuisi and extends as much as 3 miles offshore in places; Mariner shoal (*Lat. 6° 05′ S., Long 38° 49° E.*), which dries 3 feet ($0^{m}9$), lies on the outer edge of this bank, about 2½ miles north-north-eastward of the entrance to the Purahanya branch.

Wami patches are eight separate coral patches which are situated between 7 and 8½ miles east-north-eastward to eastward of the entrance to the Purahanya branch; they vary in depth from one fathom ($1^{m}8$) to awash, and are steep-to, with depths of 11 and 15 fathoms ($20^{m}1$ and $27^{m}4$) around them. These patches are very dangerous as the mud from Mto Wami and other rivers, at times makes the water so thick that at high tide, the patches cannot be distinguished.

The southern extreme of Udoe hill, bearing about 264°, leads nearly 2 miles southward of Wami patches.

Between Ras Machuisi and the entrance to Mto Kipumbwe, about 18½ miles north-north-eastward, the coast consists of a sandy beach which is used as a road to connect the numerous villages; of these latter, Mkwaja, about 9 miles northward of Ras Machuisi, is the most important.

The sandy beach is fronted by a 3-fathom ($5^{m}5$) bank, the inner part of which dries, and on which there are several coral ledges; Sange, a small rocky islet, 15 feet ($4^{m}6$) high, and not very conspicuous, stands on the largest of these drying coral ledges, about 4¾ miles southward of the mouth of Mto Kipumbwe.

About 1½ miles southward of Sange, there is a bight in the south-eastern end of the drying coral reef, called Kisikimta, which has depths of one fathom ($1^{m}8$), and forms a natural boat harbour.

Mto Kipumbwe enters the sea through a mouth about half a mile wide between mangrove swamps. There is a drying bar across the entrance, and although the river is reported to be navigable for some days' journey, it rapidly narrows within its mouth and is probably small throughout its length. The large village of Kipumbwe, at which fresh provisions may be obtained, stands close within its northern entrance point.

Machuisi is a reef, awash, lying near the outer edge of the 3-fathom ($5^{m}5$) shore bank, between one and 2 miles east-north-eastward of Ras Machuisi. There are depths of 3 feet ($0^{m}9$) in the channel between Machuisi and the coast.

Mwamba Buiuni is a reef of dead coral which dries 8 feet ($2^{m}4$), situated about 4½ miles north-eastward of Ras Machuisi.

Buiuni Mdogo is a small reef, with depths of 6 feet ($1^{m}8$), and with a rock, awash, near its western end, situated about 7 miles

Chart 640b.

north-eastward of Ras Machuisi (*Lat. 5° 56′ S., Long. 38° 49′ E.*); it is steep-to, with depths of 9 fathoms (16^m5) close around it.

Mkwaja patches consist of four small coral patches, with depths of less than 6 feet (1^m8) over them, which are steep-to, having depths of 13 fathoms (23^m8) between and around them; they lie about 10 miles north-eastward of Ras Machuisi, cover an area of about 6 cables and are dangerous, as they rarely break and are difficult to distinguish.

A white spar buoy, marked " S/MKJ " in black letters, and surmounted by two inverted triangles, is moored south-eastward of Mkwaja patches.

Mwamba Alek is a reef with depths of 4 fathoms (7^m3), with a one-fathom (1^m8) patch in its centre, lying about 5 miles south-eastward of the islet of Sange; it is steep-to, with depths of 20 fathoms (36^m6) close around it, and, although it does not break, its position is generally indicated by the light colour of the water.

Chart 664.

Genda Genda.—Genda Genda, an isolated mountain, lying about 17 miles west-north-westward of the mouth of Mto Kipumbwe, is conspicuous, and is easily identified by its two sharp peaks, the southern being 1,726 feet (526^m1) high, and the northern, 1,900 feet (579^m1) high; it is reported, however, that Genda Genda has been mistaken for Kungwe, which latter mountain is described on page 365.

Chart 640b.

Coast.—Off-lying island and dangers.—Anchorage.—Between the mouth of Mto Kipumbwe and Ras Kikogwe (Kikokwe), about 13 miles north-north-eastward, the coast continues sandy to within about 2½ miles of the latter point, whence it becomes rocky with low cliffs. Numerous drying coral ledges fringe the coast in places, and the 3-fathom (5^m5) shore bank gradually decreases in width, extending about 2 miles offshore abreast the mouth of Mto Kipumbwe and a few cables only, abreast Ras Kikogwe.

Kipumbwe reefs are a number of reefs of different sizes, with deep channels between them, which extend northward in two groups for about 7 miles parallel with the coast from abreast the mouth of Mto Kipumbwe. The outer group lies about 6 miles from the coast, and the inner group, about 2½ miles, and there is a deep channel between them. Some of these reefs dry a few feet, others do not uncover, but all are covered at high water and the outer reefs always break.

Charts 640b, 1390.

Fungu Datcha is a coral reef which always breaks heavily when not awash, situated close northward of the Kipumbwe reefs, about 7 miles south-south-eastward of Ras Kikogwe.

There is a patch with depths of one to two fathoms (1^m8 to 3^m7) about 4 cables south-westward of Fungu Datcha and 8 cables eastward of the northern end of Kipumbwe reefs.

Fungu Ushongu, situated about 6 miles south-south-eastward of Ras Kikogwe, is a large reef on which the coral dries 11 feet (3^m3) which has, on its western edge, a bank of very white sand which only covers at springs and then always breaks. The outer edge of Fungu Ushongu is very steep-to.

Mwambe (Mwamba) Makome is a narrow coral reef, which just

Charts 640b, 1390.

dries, situated about 5 miles south-south-eastward of Ras Kikogwe; care is necessary when in the vicinity of this reef, as it does not always break, and at high water and with the sun ahead, it is difficult to distinguish.

Maziwi is a small but prominent sandy island, covered with trees, which stands on the western edge of a large coral reef, about 5 miles south-eastward of Ras Kikogwe; the outer edge of the reef dries 5 feet ($1^{m}5$), and always breaks heavily. The island is frequented by turtle between the months of February and July.

During either monsoon, fair anchorage may be obtained westward of Maziwi (*Lat. 5° 30′ S., Long. 39° 04′ E.*), with more shelter than is afforded in Pangani bay; the reef is steep-to, the depths are great, and care is necessary not to anchor too close to the island.

During the south-west monsoon, a good berth is in 15 fathoms ($27^{m}4$), sand, with the northern edge of the reef bearing 055°, and Maziwi bearing 090°; during the north-east monsoon, a better berth may be obtained farther southward in 17 fathoms ($31^{m}1$), sand, with Maziwi bearing 052°.

Inner channel.—Between the inner and outer groups of the Kipumbwe reefs and farther northward between the reefs and the coast, there is a deep navigable channel in which the sea is smooth even when the monsoon is strong. This channel may be used with safety when the reefs can be plainly seen.

Low-powered craft proceeding southward against the south-west monsoon are recommended to use this channel, the northward continuation of which is described on page 412, but when southward of the Kipumbwe reefs, it is advisable to stand over to Zanzibar island, and proceed southward off that coast.

Pangani bay.—Aspect.—Pangani bay is situated at the western side of the northern entrance to Zanzibar channel; it is entered between Ras Kikogwe and a slight projection on the coast about 2½ miles north-north-eastward, but within the entrance points, the depths are less than 2 fathoms ($3^{m}7$), and vessels should anchor just outside the bay where moderate shelter is given by the off-lying reefs, and the ocean swell is broken by Zanzibar and Pemba islands.

Approaching from seaward, Maziwi is noticeable and the coastal hills present a moderately uniform elevation of about 200 feet ($61^{m}0$); a bare yellow patch on the steep face of a flat hill within Pangani bay, shows prominently when the sun shines on it from eastward, and is a good mark for indicating the position of the bay. Northward of the bay, the picturesque peaks of the Usambara mountains may be seen many miles inland above the coastal hills; Tongwe peak, an isolated, dome-shaped peak, 2,169 feet ($661^{m}1$) high, situated southward of the Usambara range and about 20 miles west-north-westward of Ras Kikogwe, is distinctive in clear weather, and should not be mistaken for Genda Genda, about 17 miles farther southward.

Chart 865, plan of entrance to Pangani river.

On a closer approach, some white houses southward of Ras Kikogwe and about 1½ miles inland, will be seen, and also a large white house on Ras Muhesa. About three-quarters of a mile west-north-westward of Ras Muhesa, Bweni bluff, about 200 feet ($61^{m}0$) high and perpendicular, rises on the southern bank of Mto Pangani opposite the town and is prominent from seaward. The Custom House, a white

Charts 664, 669, 597, 748b, 2483.

Chart 865, plan of entrance to Pangani river.

stone building, with a tower, verandah and two turrets stands on the northern bank of the river, opposite Bweni bluff.

Mto Pangani flows into the south-western corner of the bay between Ras Muhesa, about one mile north-westward of Ras Kikogwe (*Lat. 5° 27′ S., Long. 39° 00′ E.*), and a flat sandy beach, about a quarter of a mile north-north-westward, and on its northern bank, close within the sandy beach, is the town of Pangani.

Vessels that can cross the bar, can obtain anchorage in the river abreast the town.

Charts 640b, 1390.

Dangers in Pangani bay approach.—Maziwi, and the dangers in the southern approach to Pangani bay, are described on page 369.

Mwamba Mawe is a coral reef which dries 2 feet (0^m6), situated in the northern approach to Pangani bay, nearly 4 miles northward of the island of Maziwi. It is moderately steep-to, and generally breaks at half tide, and when not breaking, its position is generally indicated by the green colour of the water on it.

Mawe Mdogo is a 2-fathom (3^m7) shoal, on which the sea seldom breaks, situated about 5 miles northward of Maziwi.

Briton shoal, about 1¼ miles northward of Mawe Mdogo, and 6½ miles east-north-eastward of Ras Kikogwe, has a least depth of 4 fathoms (7^m3), and is steep-to.

South Head reef is a long, narrow reef of sand and coral, the northern part of which dries, which lies parallel with the coast, about 3 miles offshore; its southern extreme is about 7½ miles north-eastward of Ras Kikogwe, and its northern end is connected to Fungu Tongone, a reef northward of it, by a 3½-fathom (6^m4) ridge. Fungu Tongone and the dangers northward of South Head reef, are described on page 411.

Chart 865, plan of entrance to Pangani river.

Mto Pangani entrance.—Bar.—Buoys.—Beacons.—The northern entrance point to Mto Pangani is fronted by a drying sandbank which extends nearly one mile east-south-eastward. The entrance to the river, which lies between the southern edge of the above bank and the drying reef which fringes the southern shore of the bay between Ras Kikogwe and Ras Muhesa, is filled by a bar, which extends about three-quarters of a mile seaward from abreast Ras Muhesa (*Lat. 5° 26′ S., Long. 38° 59′ E.*).

From examinations made between the years 1873 and 1922, there appears to have been little or no change in the depths on the bar, but the depths on the bar, and probably its position, vary with the seasons, and may be as little as 3 feet (0^m9). Vessels of a draught of 13 feet (4^m0) and 230 feet (70^m1) in length, can usually enter the river. Within the bar, there are depths of from 11 to 14 feet (3^m4 to 4^m3) at the anchorage abreast the Custom House.

With an in-going tidal stream and a moderate breeze, the bar is usually smooth, but during the period of the out-going tidal stream, especially at springs, it is frequently dangerous for boats. About the month of June, when floods in the interior are common, the out-going tidal stream attains great velocity.

The northern side of the channel across the bar is marked by two black conical buoys, the outer one being marked "Pangani."

A beacon, consisting of a pole surmounted by a square, and painted

Chart 865, plan of entrance to Pangani river.

red, white and black, stands on the southern side of the channel, about 1¼ cables east-north-eastward of Ras Muhesa.

A white triangular beacon with an elevation of 40 feet (12^m2), stands on the northern bank of the river, about 2 cables westward of the Custom House. This beacon marks a telegraph standard from which an overhead cable spans the river with a clearance of about 60 feet (18^m3).

Signal station.—A signal station, consisting of an octagonal stone tower, with a flagstaff close to it, stands on Ras Muhesa (*Lat. 5° 26′ S., Long. 38° 59′ E.*), by the side of a large white house.

Charts 640b, 1390.

Anchorage.—Directions.—The best anchorage off Pangani bay is in a depth of 5 fathoms (9^m1), sand and mud, with Bweni bluff bearing 285°, the northern end of the sandy beach at the head of the bay bearing 328°, and the tangent to the coast southward of the bay, bearing 206°.

Vessels from southward should steer to keep the island of Maziwi slightly on the port bow, and if from northward, on the starboard bow, until Tongwe peak is in line with Bweni bluff, bearing about 297°. This line will lead northward of the reef which surrounds Maziwi to the outer anchorage. Should Tongwe peak not be visible, a not infrequent occurrence, the reef always shows so clearly that the eye is a sufficient guide for passing it in safety.

No marks can be given for the passage southward of Maziwi, but with the sun in a favourable position, the dangers can be clearly seen.

Chart 865, plan of entrance to Pangani river.

The following directions for entering Mto Pangani were those in use in 1929:—

Vessels should steer to pass southward of the outer buoy, leaving it on the starboard hand, and should then steer direct for the beacon off Ras Muhesa until the inner buoy bears about 340°; round the beacon, leaving it on the port hand, and steer for the anchorage abreast the Custom House, taking care to avoid the 2 foot (0^m6) spit, which extends about 3 cables eastward of Bweni bluff.

Town.—The town of Pangani stands among palm groves on the northern bank at the entrance to the river; it has numerous stone buildings, but, being fronted by mangroves, its surroundings tend to make it unhealthy. Bweni village is situated on the southern bank, opposite the town.

Fresh provisions are obtainable. Water can be obtained from a well close to the river bank, from which a supply can be pumped to boats through a hose, but the water thus obtained is brackish.

Considerable trade is carried on with Zanzibar and Pemba islands by dhows, which load and discharge cargo in the river.

Communications.—The town is connected to the general telegraphic system.

Charts 640b, 597.

Mto Pangani above the town.—Mto Pangani is one of the largest rivers on this part of the coast and rises in Kilimanjaro, a mountain situated about 170 miles in a direct line north-westward of its mouth. Like all rivers on this coast, its depths vary with the seasons, the river being at its highest level about June and lowest about January.

For about 11 miles above the town of Pangani, as far as the village

Charts 640b, 597.

of Pombwe, there are depths of not less than 6 feet (1ᵐ8), but thence to Chogwe, about 4 miles higher up, the depths are less than 3 feet (0ᵐ9) in places, although these shoal places can be passed by small craft near high water. The river is tidal for about 7 miles above Pombwe, and it is reported that, during the dry season, there are depths of not less than 3 feet (0ᵐ9) in the channel to within a short distance of the Pangani falls, and vessels of a draught of 2 feet (0ᵐ6) could probably ascend as far as the Pangani falls at all seasons.

Above the Pangani falls, the river is navigable only in parts, between cataracts.

For about 4 miles above the town of Pangani (*Lat. 5° 26′ S., Long. 38° 59′ E.*), the river runs through dense mangroves, above this point, it flows through open and fertile country.

Coast.—The description of the coast northward of Pangani bay is continued on page 410.

Charts 640a and b.

ZANZIBAR ISLAND.—General remarks.—The island of Zanzibar is the largest and most important of the many coralline islands lying off the east coast of Africa, and is the centre of most of the trade between the interior of Central Africa and the ports on this part of the coast.

The island is undulating, the ranges of hills generally running northward and southward with plains between, and although in some places the soil is sandy, parts of the island are most fertile and tropical cereals and edible roots grow in great profusion.

The coast in most places consists of low, steep cliffs, and the island stands on a coral reef which, on its eastern side, extends as much as 2 miles offshore in places. Except in the inlets, this coral reef is generally very steep-to; it dries from one to 2 feet (0ᵐ3 to 0ᵐ6) and is flat, except that its outer edge is somewhat higher than its average level, and the off-lying reefs are of precisely the same character.

The eastern coast of the island possesses no harbours, the depths in Chwaka bay, the only indentation on this coast, being too shoal to afford sheltered anchorage, but there are several good anchorages on the western side of the island, although Zanzibar harbour, situated at about the centre of the western coast, is the only one frequented by ocean-going vessels.

There are six passes or channels through the reefs surrounding Zanzibar harbour by which it may be approached, two from southward, one from westward and three from northward. Of these passes, Southern pass and English pass, each with a least depth of 6 fathoms (11ᵐ0), are buoyed and lighted, and are the passes generally used, the former by vessels from southward and the latter by vessels from northward.

The coasts of Zanzibar island and the approaches and harbour of Zanzibar, are described below in the following order:—South-western coast of Zanzibar island; southern approach to Zanzibar harbour; western approach to Zanzibar harbour; north-western coast of Zanzibar island, described from northward to southward; northern approach to Zanzibar harbour; Zanzibar harbour; eastern coast of Zanzibar island.

Caution.—In 1948, it was reported that the leading marks for

Charts 664, 669, 748b, 2483.

Charts 640a and b.

Southern pass and English pass, leading into Zanzibar harbour, were in nearly every case partially obscured by vegetation.

Chart 640a.

SOUTH-WESTERN COAST OF ZANZIBAR ISLAND.— Ras Kizimkazi.—Current.—Ras Kizimkazi (*Lat. 6° 28′ S., Long. 39° 30′ E.*), the southern extreme of Zanzibar island, is rounded, and without any distinct projection. The adjacent coast consists of cliffs, about 15 feet ($4^{m}6$) high, within which the land gradually rises to an elevation of about 100 feet ($30^{m}5$), and is covered with dense bush. The cliffs overhang, and landing in this vicinity is only possible about 2 miles north-westward of the southern extreme of Ras Kizimkazi, where there is a sandy bay abreast the village of Kizimkazi; there are several white buildings in the village which are visible from seaward, and some tall coconut palms, which are distinctive on some bearings.

The coast adjacent to Ras Kizimkazi is fringed with a drying coral ledge which extends as much as three-quarters of a mile offshore, on which the sea breaks heavily; this ledge is very steep-to, and in places, north-north-eastward of Ras Kizimkazi, there are depths of 30 fathoms ($54^{m}9$), close to its edge.

Off Ras Kizimkazi, the current at all times sets north-westward into Zanzibar channel, and is much stronger during the south-west monsoon; its strength is increased during the period of the rising tide.

Coast.—Off-lying islands and dangers.—Light.—From Ras Kizimkazi, the coast trends north-north-westward and consists of cliffs and sandy beaches alternately for about 6 miles to the entrance to Peete inlet, an inlet formed by the islands of Vundwe (Wundwi) and Uzi, which front the coast for a further 6 miles north-north-westward. Peete inlet is entered eastward of Ras Bweni, the rocky southern extreme of Vundwe, and has depths of one to 4 fathoms ($1^{m}8$ to $7^{m}3$) in a narrow channel fringed by reefs. The head of the inlet is lost in mangrove swamps through which, there is at high tide, a narrow canoe channel which leads to the sea, northward of the island of Uzi.

Charts 665 and 640a.

Between Ras Bweni and Ras Yeketekambe, the south-eastern extreme of the Kombeni (Kumbeni) peninsula, about 9 miles north-westward, the coast is fronted by a chain of islets and reefs, which extends north-westward to Zanzibar harbour and forms the north-eastern side of Zanzibar channel; a 2-fathom ($3^{m}7$) bank, on which there are several drying reefs and sunken rocks, extends south-south-eastward from the Kombeni peninsula and connects it to the chain of islets and forms the western side of Menai bay.

Menai bay is entered between Ras Bweni and Pungume (*Lat. 6° 26′ S., Long. 39° 20′ E.*), the southernmost of the chain of islets, about 4½ miles westward. The eastern shore of the bay is low, with cliffs and sandy bays alternately, and is fringed with a drying coral reef, which extends as much as three-quarters of a mile offshore. At the north-western corner of the bay, the Kombeni peninsula is about 40 feet ($12^{m}2$) high and flat, but on its northern part, nearly 4 miles north-north-westward of Ras Yeketekambe, stands Hatajwa an isolated, rounded hill of coralline rock, 206 feet ($62^{m}8$) high, which

Charts 664, 662, 669, 597, 748b, 2483.

Charts 665 and 640a.

rises from a flat plain and is very noticeable. *See* view C on chart 665.

The inner part of Menai bay is fronted by the islets of Miwi and Niamembe and is encumbered with numerous drying reefs and shoals; it is divided by a narrow island, named Ukanga, into the two smaller bays of Kiwani and Kombeni. The head of Menai bay is a mangrove swamp into which flows Mto Mwera, one of the largest rivers in Zanzibar island.

Chart 640a.

Pungume, a rocky island with cliffs, about 10 feet ($3^{m}0$) high, and covered with trees, the tops of which were, in 1874, about 40 feet ($12^{m}2$) high, stands on the southern part of a large drying coral reef, about 7 miles south-south-eastward of Ras Yeketekambe. On its eastern side is a sandy beach, off which, on the edge of the reef, is an islet which is very prominent from southward; there are two other islets on the northern part of the reef, while at its northern extreme is a sandbank, which dries 11 feet ($3^{m}4$).

A light is exhibited, at an elevation of 85 feet ($25^{m}9$), from a white square tower with black bands, 71 feet ($21^{m}6$) in height, situated on the south-western extreme of Pungume (*Lat. 6° 26′ S., Long. 39° 20′ E.*).

Pungume patches are several banks lying in the fairway of vessels bound for Zanzibar harbour. Bedford bank, the southernmost patch, lies about 6½ miles south-eastward of Pungume lighthouse; it has a least depth of 5 fathoms ($9^{m}1$), and is steep-to.

Moore bank, with a least depth of 3 fathoms ($5^{m}5$), and steep-to, lies about 3 miles south-south-eastward of Pungume lighthouse, and another patch, with depths of from 3 to 5 fathoms ($5^{m}5$ to $9^{m}1$) on it, lies about 4 miles east-south-eastward of Pungume lighthouse.

The bottom is plainly visible when nearing Pungume patches, but their vicinity should be avoided by vessels of deep draught.

No good marks can be given for passing westward of Pungume patches. Hatajwa hill, bearing about 338° and open westward of the island of Pungume, leads about 2 miles westward of Bedford bank, but only a few cables westward of Moore bank, and this hill, which is only 206 feet ($62^{m}8$) high, is about 18 miles distant from Bedford bank.

Charts 665 and 640a.

Kwale is a low rocky island covered with bush, situated about 3 miles north-westward of Pungume; the tops of the highest trees on Kwale are about 30 feet ($9^{m}1$) high. The island stands on a drying reef which is always visible, the eastern and western edges of which are steep-to, but a 4-fathom ($7^{m}3$) ridge connects its southern end to the northern end of the reef surrounding Pungume, and its northern end is connected to the coast of the Kombeni peninsula by a bank, on which the depths are less than 2 fathoms ($3^{m}7$).

Two narrow channels, separated by a drying reef, lead across the bank connecting Kwale to the coast, and another drying reef, on which are several islets, called Pamunda, lies close eastward of the southern channel. There are depths of 10 feet ($3^{m}0$) in the southern channel and of 6 feet ($1^{m}8$) in the northern channel, which latter is only available for very small craft.

The northern extreme of the islet of Niamembe bearing 086°, and seen in the gap between the two southern islets of Pamunda, leads through the centre of the southern channel.

Charts 664, 669, 597, 748b, 2483.

Charts 665 and 640a.

Anchorages.—Small vessels may obtain convenient anchorage for a night on Pungume patches, especially during the north-east monsoon.

Vessels of any description may obtain temporary anchorage between Pungume (*Lat. 6° 26′ S., Long. 39° 20′ E.*) and Kwale, in a depth of 7 fathoms ($12^{m}8$), with the northern islet on the reef surrounding Pungume bearing 078°, and the north-western extreme of Kwale bearing 327°.

Good holding ground will be found anywhere in the outer part of Menai bay, but when the south-west monsoon is strong, sheltered anchorage can only be obtained northward of Pungume or within the islets of Niamembe and Miwi; small craft may proceed closer to the head of the bay and anchor in a depth of 6 fathoms ($11^{m}0$) north-eastward of the islet of Sumi, but this part of the bay is encumbered with shoals, and navigation is intricate, the eye and the chart being the only guides.

Chart 665.

SOUTHERN APPROACH TO ZANZIBAR HARBOUR.—Coast.—Passes.—Between Ras Fumba, a low rocky point situated at the south-western extreme of the Kombeni peninsula, about 1½ miles westward of Ras Yeketekambe, and Ras Buyu, a somewhat similar point about 5 miles north-westward, the coast is low and is fringed by a drying coral reef which extends as much as half a mile offshore in places.

Between Ras Buyu and Ras Chukwani, about 1½ miles northward, the coast consists of cliffs alternating with white sandy bays; the cliffs at Ras Buyu are reddish in colour and are the highest and most extensive on this part of the coast. Between Ras Chukwani and Ras Mbweni, about 1½ miles farther northward, the coast is low, but close to the latter point are some red cliffs, which, owing to their brighter colour, are more noticeable than those at Ras Buyu. Mbweni house, situated on the coast about half a mile southward of Ras Mbweni, is prominent except against the morning sun, at which time it is difficult to distinguish any features on this coast.

From southward, Zanzibar harbour may be approached either through Inner pass or through Southern pass. Inner pass is entered close northward of Kwale, and lies between the western coast of the Kombeni peninsula and the chain of islets and reefs extending north-westward of Kwale. The pass has a least depth of 4½ fathoms ($8^{m}2$) and is much used by dhows in order to avoid the current. As, however, no good marks exist, Inner pass must be navigated by eye and no directions can be given.

Southern pass is entered between Kwale and Boribu, a reef lying about 13 miles westward of Kwale (*see* page 374); it has a least depth of 6 fathoms ($11^{m}0$) in a narrow channel about 1¼ cables in width, but the channel is buoyed and lighted and Southern pass is generally used by vessels approaching Zanzibar harbour from southward.

Islands and dangers on the eastern side of Southern pass.—Light.—Buoyage.—Kipwa Gini is a small coral patch, with a least depth of 1¾ fathoms ($3^{m}2$), situated about 1¼ miles westward of the north-western extreme of Kwale (*Lat. 6° 22′ S., Long. 39° 17′ E.*).

Mwamba Ukombe (Ukombi) is a reef, divided into two parts by a

Charts 664, 669, 597, 748b, 2483.

Chart 665.

narrow shoal channel; its southern extreme lies about 3 miles north-westward of Kwale, whence it extends for about 4½ miles parallel with the coast of the Kombeni peninsula, at about 1½ miles offshore. It is steep-to, and is easily distinguished from aloft, but it only dries in patches at low water springs. On the northern part of Mwamba Ukombe are three rocky islets, about 10 feet (3^{m}0) high, the two southern islets being called Tali, and the northern, Ukombe.

A 5-fathom (9^{m}1) bank extends more than one mile south-eastward. On this bank, about 6 cables south-eastward of the southern extreme of the reef, there is a 3-fathom (5^{m}5) shoal. A 2-fathom (3^{m}7) shoal exists about 4 cables northward of the north-western extreme of Mwamba Ukombe reef.

A black can buoy is moored about 7 cables northward of Ukombe islet.

Mwamba Chumbe is an extensive reef lying about three-quarters of a mile west-north-westward of Mwamba Ukombe and about 2½ miles south-westward of Ras Buyu; it is steep-to and dries in patches and may be distinguished from aloft. There is a passage, with depths of 6 fathoms (11^{m}0), between the north-western extreme of Mwamba Ukombe and the southern extreme of Mwamba Chumbe, which is often used by dhows. Chumbe, a small island, covered with trees, the tops of which are about 45 feet (13^{m}7) high, stands on the north-western part of Mwamba Chumbe, nearly 3 miles south-westward of Ras Buyu.

A light is exhibited, at an elevation of 120 feet (36^{m}6), from a white square stone tower, 113 feet (34^{m}4) in height, situated on the western side of Chumbe.

Ariadne bank is a small bank, with a least depth of 2¾ fathoms (5^{m}0), situated about 3¾ miles southward of Chumbe lighthouse; it is steep-to, and can easily be distinguished from aloft.

A light-buoy, exhibiting a *flashing white* light *every second*, is moored on the north-eastern side of Ariadne bank.

Hatajwa hill, bearing about 055° or 047°, and open either northward or southward, respectively, of the islets of Tali, leads northward or southward of Ariadne bank.

The shoals of Mtwana are three shoals, lying on a 5-fathom (9^{m}1) bank, which extends nearly 2 miles westward of Ras Chukwani (*Lat. 6° 14′ S., Long. 39° 12′ E.*). The southern shoal, which has a least depth of 2½ fathoms (4^{m}6), lies about 1¼ miles west-south-westward of Ras Chukwani, and the western shoal, with a least depth of 1¾ fathoms (3^{m}2), lies about 1¾ miles westward of that point; the third shoal, which has a least depth of one fathom (1^{m}8), lies about half a mile eastward of the western shoal. Two other small shoals, with depths of from 4 to 4½ fathoms (7^{m}3 to 8^{m}2) over them, lie about 2¼ miles west-south-westward of Ras Chukwani; they are steep-to and should be avoided.

A conical light-buoy, painted in black and white vertical stripes, and exhibiting a *white flashing light*, is moored close westward of the western Mtwana shoal, about 1¾ miles westward of Ras Chukwani.

Dangers on the western side of Southern pass.—Light-buoy.—Boribu is a reef, lying about 6¾ miles west-south-westward of Chumbe lighthouse; it dries 3 feet (0^{m}9), and there is a small white sandbank, which dries 8 feet (2^{m}4), at its north-western end.

Charts 640a, 664, 669, 597, 748b, 2483.

Chart 665.

Tambare is a coral reef, lying about 6½ miles westward of Chumbe lighthouse; it dries 4 feet (1m2) and there is a sandbank at its northern end, which dries 6 to 11 feet (1m8 to 3m4). Tambare is steep-to and can generally be distinguished.

Outer Tambare is a coral patch, with a least depth of 1¼ fathoms (2m3) over it, lying about 8½ miles westward of Chumbe lighthouse; the patch can always be distinguished.

Pwakuu is an extensive drying reef, lying between 4½ and 7½ miles west-north-westward of Chumbe lighthouse; on its western part is a large sandbank, which dries 10 feet (3m0).

Nyange is a reef, lying eastward of Pwakuu, and separated from it by a channel about 5 cables wide, with a rocky patch with less than 6 feet (1m8) in mid-channel. The south-eastern side of Nyange lies about 3 miles north-westward of Chumbe, and should be sighted shortly after passing that island. A sandbank, which dries 11 feet (3m4), lies on the northern part of Nyange (*Lat. 6° 13′ S., Long. 39° 09′ E.*).

Kisiki, a reef awash, lies about 1½ miles westward of Ras Mbweni; a sandbank on the northern end of Kisiki dries 3 feet (0m9), and shows so white, that it can generally be seen at any state of the tide.

A shoal patch, with depths of less than 3 fathoms (5m5) and a rock, with less than 6 feet (1m8), in the centre, extends 6 cables north-north-westward of the drying sandbank on Kisiki. A very narrow channel, with a least depth of 4½ fathoms (8m2) lies between this shoal and Kisiki.

A shoal spit, with patches of from 2¼ to 4½ fathoms (4m1 to 8m2), extends southward from Kisiki towards the western shoal of Mtwana, and contracts the width of the channel to little over one cable with a least depth of 6 fathoms (11m0).

A conical light-buoy, painted in red and white vertical stripes and exhibiting a *red flashing* light, is moored about half a mile south-eastward of Kisiki, and about 1¼ miles west-south-westward of Ras Mbweni.

Charts 3211 and 665.

Inner part of Southern pass.—Lights.—Dangers.—Within the narrows, the eastern side of Southern pass is formed by the coast of Zanzibar island. White cliffs, from 50 to 70 feet (15m2 to 21m3) high, extend for over a mile northward of Ras Mbweni along the shore of a slight bight between the latter point and Ras Shangani, a rounded, sandy point, about 2½ miles north-north-westward. The town of Zanzibar is situated close within Ras Shangani, and, owing to the whiteness of its buildings, is visible from a considerable distance northward and southward. Buildings noticeable from southward are the British Residency, a white building with a red roof, which has a castellated tower with a flagstaff at its southern end, situated about 3½ cables south-eastward of Ras Shangani (*Lat. 6° 10′ S., Long. 39° 11′ E.*), and a large, square building, close within the extreme of the latter point, and at Kiungani, nearly 1½ miles south-eastward of Ras Shangani, the Anglican mission, a white, square, three-storeyed building with a flagstaff, is also prominent.

A light is exhibited, at an elevation of 145 feet (44m2), from the conspicuous clock tower of the Government buildings, situated about 2¾ cables east-north-eastward of Ras Shangani.

Charts 3211 and 665.

Leading lights are established near Kiungani. The front light is exhibited, at an elevation of 30 feet ($9^{m}1$), from a square, framework, iron tower, 45 feet ($13^{m}7$) in height, painted white with a black vertical stripe, standing on the reef which fringes the coast, about half a mile southward of Kiungani mission house. The rear light is exhibited, at an elevation of 130 feet ($39^{m}6$) from a white beacon, 43 feet ($13^{m}1$) in height, situated about half a mile north-eastward of the front light. These two light-beacons, in line with a double clump of trees about 4¼ miles north-eastward of the rear light-beacon, or at night, their lights in line and bearing 033°, lead in depths of not less than 6 fathoms ($11^{m}0$) through the narrow channel between Mtwana and Kisiki.

A chain of reefs and shoals extends north-westward from Kisiki to Zanzibar harbour, and forms the western side of the inner part of Southern pass.

Pange, a reef on which is a large sandbank, which dries 15 feet ($4^{m}6$), lies close north-westward of Kisiki, about 2½ miles west-north-westward of Ras Mbweni ; there is a least depth of 5 fathoms ($9^{m}1$) in the narrow channel between the shoal north-north-westward of Kisiki and Pange.

A patch, with a depth of 1¾ fathoms ($3^{m}2$) lies about 4 cables northward of the sandbank on Pange, and about 1½ miles west-south-westward of Ras Shangani (*Lat. 6° 10′ S., Long. 39° 11′ E.*).

Fungu Chawamba is a reef which dries 4 feet ($1^{m}2$), situated close northward of the western part of Pange and about 2¼ miles west-south-westward of Ras Shangani ; it is steep-to and can generally be distinguished. In 1953, a conspicuous wreck lay on the north-western extreme of Fungu Chawamba.

Five coral patches are situated between 2 cables and 10 cables northward of Fungu Chawamba ; the two southern patches have least depths of 2½ fathoms ($4^{m}6$) and 3¾ fathoms ($6^{m}9$), the two middle patches each have rocks, nearly awash, near their centres, and the northern patch has a least depth of 3 fathoms ($5^{m}5$).

Charts 640a and 665.

Directions (continued from page 351).—In clear weather, Ras Kizimkazi should be sighted at a distance of about 15 miles. When sighted, vessels from eastward should steer to keep it on the starboard bow until the island of Pungume is sighted, when course should be shaped to pass about 4 miles southward of Ras Kizimkazi, and the south-eastern extreme of that point should be kept bearing less than 060° until Pungume bears about 338°.

From a position south-westward of Bedford bank, described on page 374, vessels should steer about 320° in order to pass about 2 miles south-westward of Kwale and about three-quarters of a mile south-westward of Chumbe. In order to avoid Kipwa Gini, the southern extreme of Pungume should be kept bearing less than 126°, until Hatajwa hill bears more than 011°.

If passing eastward of Ariadne bank, the large, square building near the extreme of Ras Shangani should be kept bearing less than 002°, and open eastward of Chumbe, until Hatajwa hill bears more than 055°, and is open northward of the islets of Tali.

Chart 665.

If passing westward of Ariadne bank, the square building should

Chart 665.

be kept bearing more than 007°, and open westward of Chumbe (*Lat. 6° 17′ S., Long. 39° 11′ E.*).

From abreast Chumbe, steer about 343° until the leading beacons at Kiungani are in line, bearing 033°, *see* view C on chart 665; when they should be steered for on that bearing, passing westward of the light-buoy, painted in black and white vertical stripes, marking the eastern side of the channel, and thence keeping slightly eastward of the line to give a wide berth to the shoal patches on the spit extending southward of Kisiki.

When Ras Buyu and Ras Fumba are in line, bearing about 138°, vessels will have passed the narrows, but they should continue to keep on the line of Kiungani leading-beacons until abreast the light-buoy painted in red and white vertical stripes, marking the western side of the channel, when course may be altered northward, and shaped for the anchorage northward of Ras Shangani, rounding the latter point at a distance of from 3 to 4 cables.

Charts 3211 and 665.

WESTERN APPROACH TO ZANZIBAR HARBOUR.—Western pass.—Caution.—From westward, Zanzibar harbour may be approached through Western pass, the entrance to which lies between the northern extreme of Fungu Mapape, about 6 miles westward of Ras Shangani, and the south-western extreme of a reef which surrounds the island of Bawi, about 4 miles westward of that point. There is a least depth of 6 fathoms (11^{m}0) in Western pass, but the channel is not marked, and vessels are advised not to use this route unless there is a favourable light for distinguishing the banks and dangers. *See* view B on chart 665.

Several submarine cables are laid through Western pass, and vessels should avoid anchoring in any part of it.

Dangers on the southern side of Western pass.—Fungu Mapape and Mwamba Mapape are two drying reefs which lie on a narrow 5-fathom (9^{m}1) bank, extending northward and southward, the southern extreme of which is about 6 miles west-south-westward of Ras Shangani. Fungu Mapape, the northern reef, has a white sandbank, which dries 6 feet (1^{m}8), and Mwamba Mapape has a sandbank, which dries 4 feet (1^{m}2); there is a least depth of 3¼ fathoms (5^{m}9) in the channel separating the two reefs.

Murogo is a reef lying about 4 miles west-south-westward of Ras Shangani, and has on it a large sandbank, which dries 8 feet (2^{m}4), and which can generally be distinguished. There are wide, deep channels both eastward and westward of Murogo, which can be navigated by eye with safety.

Fungu Chawamba and the patches lying close northward of it, are described on page 378.

Islands and dangers on the northern side of Western pass.—Bawi (*Lat. 6° 09′ S., Long. 39° 08′ E.*), a low island, covered with scrub and with a few coconut palms, lies about 3 miles west-north-westward of Ras Shangani. The island stands on a drying reef which extends nearly one mile southward of it and on which there are several small sandbanks, which dry 6 feet (1^{m}8).

Mwamba Bawi, a coral reef, on which is a narrow strip of sand which dries 6 feet (1^{m}8), lies about one mile northward of

Charts 3211 and 665.

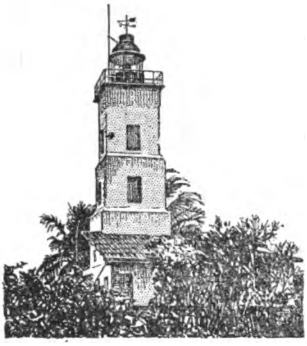
Bawi, to which it is connected by a ridge with depths of less than 6 feet ($1^{m}8$).

The island of Chango and the dangers extending southward of it, are described on page 385.

Directions.—After rounding the south-western extreme of the reef extending southward of Bawi, steer about 040°, between the south-eastern side of that reef and the coral patches extending northward of Fungu Chawamba, until the clock tower in the town of Zanzibar bears 103°; course may then be shaped towards the anchorage, taking care to avoid the shoal spit extending southward of Chango.

Chart 640b.

NORTH-WESTERN COAST OF ZANZIBAR ISLAND.—Ras Nungwi.—Light.—Off-lying bank.—Current.—Ras Nungwi, the northern extremity of Zanzibar island, consists of a low sandy point, southward of which the land rises gradually and is covered with dense thick scrub. There is little or no cultivation of crops. Coconut palms grow in profusion on the point, which is fringed by a drying reef, extending about 7 cables northward and following the trend of the eastern coast southward at a decreasing distance offshore. This coral reef is prominently indicated by breakers at all states of the tide, when any swell is running.



Ras Nungwi lighthouse.
(*Original dated* 1929.)

The village of Nungwi (*Lat. 5° 44′ S., Long. 39° 18′ E.*), among the coconuts is the largest at this end of the island and has a large fishing community.

A light is exhibited at an elevation of 60 feet ($18^{m}3$) from a white square tower with a red top, 47 feet ($14^{m}3$) in height, situated on Ras Nungwi; the lighthouse is connected to the town of Zanzibar by telephone.

Leven bank, a coral bank with depths of from 6 to 10 fathoms ($11^{m}0$ to $18^{m}3$) on it, lies about 5 miles northward of Ras Nungwi; it is steep-to, the depths increasing to over 100 fathoms ($182^{m}9$) within half a mile. During light winds, good temporary anchorage may be obtained on Leven bank.

In the vicinity of Leven bank, the current sets constantly north-north-westward, attaining a velocity of 1½ to 3 knots during the north-east monsoon.

Coast.—Anchorage.—Between Ras Nungwi and Ras Uso wa Membe (*Lat. 5° 54′ S., Long. 39° 12′ E.*), a low cliffy point about 12 miles south-south-westward, the north-western coast of Zanzibar island is fronted by an extensive drying reef, to the westward of which lies the island of Tumbatu. Between Tumbatu and this reef lies the sheltered harbour of Mkokotoni.

About 5 miles southward of Ras Nungwi is Kigunguli hill, a conspicuous coralline knoll, about 222 feet ($67^{m}7$) in height. Uwemba hill, about 3 miles southward of Kigunguli hill, rises steeply near the

Charts 664, 669, 597, 748b, 2483.

Chart 640b.

eastern shore of Mkokotoni harbour; it is thickly covered in trees, the tops of which are about 290 feet (88^{m}4) in height.

About 3 miles south-westward of Uwemba hill lies Pale hill at the north-western end of the coralline ridge which runs southward down the island, rising gradually on its eastern side but with a steep western face. Pale hill is covered with coconut palms and other trees, whose tops are about 285 feet (86^{m}9) in height; it shows conspicuously from the northward of Mkokotoni harbour.

The Donge hills, about 390 feet (118^{m}9) in height and covered with coconut palms, reach their summit about 2½ miles southward of Pale hill and are the highest part of the northern end of the island. Between the Donge hills and Ras Uso wa Membe lies a mangrove creek and marshy plain through which flow Mto Zingwi-Zingwi and Mto Mwanakombo. Mto Kipange flows through the valley separating the Donge hills from Pale hill; it enters Mkokotoni harbour at Ras Mwanda, about 2 miles eastward of Ras Uso wa Membe (*Lat. 5° 54′ S., Long. 39° 12′ E.*).

During the south-west monsoon good anchorage may be obtained in the northern approach to Mkokotoni harbour, in a depth of 10 fathoms (18^{m}3), sand, with Ras Nungwi lighthouse bearing 068°, distant about 3 miles.

Tumbatu.—Light.—Off-lying dangers.—The island of Tumbatu is low and flat, rising slightly to the south-westward; it is covered with scrub and its coast, except for a portion of the eastern side, is formed of low and often overhanging cliffs, from 10 to 60 feet (3^{m}0 to 18^{m}3) in height. Mwana wa Mwana, a coral islet, covered with dense scrub, lies on the reef close northward of Tumbatu.

A light is exhibited, at an elevation of 85 feet (25^{m}9), from a white square tower 76 feet (23^{m}2) in height, situated near the northern extreme of Mwana wa Mwana and about 5 miles west-south-westward of Ras Nungwi. There are some iron steps close westward of the lighthouse, protected from the prevailing south-easterly swell, with a depth of 6 feet (1^{m}8) alongside at high water springs.

The northern extremity of the reef surrounding Tumbatu lies about 4 cables northward of Mwana wa Mwana and a 6-fathom (11^{m}0) spit extends about 11 cables north-eastward of the islet with a least depth of 1½ fathoms (2^{m}7) at its northern end. From Mwana wa Mwana to Ras Bwechano (*Lat. 5° 51′ S., Long. 39° 12′ E.*) about 5 miles southward, the western side of Tumbatu is steep-to; the edge of the reef nowhere extends more than one cable from the cliffs.

The southern extreme of the reef is formed by a detached drying spit, which extends 1½ miles south-westward of Ras Kiyomoni, the southern point of Tumbatu. A sandbank, known as Mmawali sand, which dries 7 feet (2^{m}1), lies at the south-eastern end of the reef about 1½ miles north-north-eastward of Ras Uso wa Membe. From Ras Bwechano to Ras Kiyomoni depths of less than 6 fathoms (11^{m}0) extend up to 5 cables from the edge of the reef.

The inhabitants of Tumbatu are the descendants of the Zanzibar aboriginals and are aloof and of an independent nature. They are good sailors and supply pilots for the neighbouring coasts. Apart from two wells on the eastern coast, there is no natural water on the island, daily supplies being transported from the village of Mkokotoni. Nankivell rock, with a least depth of 3 fathoms (5^{m}5) over it, lies

Charts 664, 669, 597, 748b, 2483.

Chart 640b.

about 2½ miles north-north-eastward of Mwana wa Mwana lighthouse in the fairway of vessels rounding Ras Nungwi and bound for Zanzibar. Two other pinnacles, with least depths of 3¾ fathoms (6^{m}9) and 5½ fathoms (10^{m}1), lie about 4 cables southward and one mile eastward, respectively, of Nankivell rock. In order to pass northward of Nankivell rock, vessels should keep Ras Nungwi lighthouse bearing more than 098° until the western coast of Tumbatu bears about 183° and is open westward of Mwana wa Mwana lighthouse.

Shearwater patches lie on a bank about 10 miles in length, running parallel to and about 4 miles distant from the west coast of Tumbatu, from Mwana wa Mwana to Ras Uso wa Membe. The bottom is very uneven but most of the patches are, in favourable weather, distinguishable by their colour and, in many cases, by tide rips.

Wright rock (*Lat. 5° 48′ S., Long. 39° 09′ E.*) is a pinnacle of coral, with a least depth of 3 feet (0^{m}9), lying on a shoal on the eastern side of the bank about 5 miles south-westward of Mwana wa Mwana lighthouse. Near the northern extremity of the bank is a patch with 3¾ fathoms (6^{m}9) over it, about 1¾ miles northward of Wright rock ; a detached shoal, with a least depth of 2¼ fathoms (4^{m}1) lies eastward of the bank and about 1¼ miles north-eastward of Wright rock.

Langdon rocks, both with a least depth of 3 feet (0^{m}9), lie close together about 5 miles westward of Ras Uso wa Membe ; there is a 3-fathom (5^{m}5) patch about 2¼ miles north-north-eastward and a 2-fathom (3^{m}7) patch about 4 cables northward of Langdon rocks. A patch, with less than 6 feet (1^{m}8), lies about 7 cables southward of them.

On the bank there are numerous pinnacles with depths of 3¼ to 6 fathoms (5^{m}9 to 11^{m}0), the positions of which can best be seen from the chart.

Dalrymple shoal with a least depth of 2¾ fathoms (5^{m}0) lies at the northern end of a detached bank running northward from Shearwater patches.

Directions.—Vessels approaching Zanzibar from northward by night, should make for a position 1½ miles 206° from Mwana wa Mwana lighthouse, whence course should be shaped to keep this light astern bearing 026° until Mangapwani light (*Lat. 5° 57′ S., Long. 39° 11′ E.*) bears 145°, when course should be altered to 165°, which will bring vessels on to the leading lights leading through English pass (page 386).

By day, in clear weather, vessels may make for a position three-quarters of a mile westward of Mwana wa Mwana lighthouse and shape a course to pass 9 cables 270° from Ras Uso wa Membe, thence passing through the deep water channel between the reef off Ras Uso wa Membe and Glenday patches (page 384). Vessels should keep within half a mile of the coast until the white house with a red roof at Mangapwani is abeam ; from this point there are no more dangers northward of Seagull shoal (page 385) about 6 miles southward.

The description of the coast southward of Ras Uso wa Membe, is continued on page 384.

Mkokotoni harbour.—Entrances.—Buoys.—Mkokotoni harbour affords sheltered anchorage in a large area with depths of from 6 to 8 fathoms (11^{m}0 to 14^{m}6). The village of Mkokotoni stands on the southern shore of the harbour, about 4 miles east-north-eastward of Ras Uso wa Membe, and in the adjacent district which is also called

Charts 664, 669, 597, 748b, 2483.

Chart 640b.

Mkokotoni, there are numerous small villages and the land is well cultivated.

The northern entrance is about 1¼ miles wide between the reefs which fringe the coast southward of Ras Nungwi and the extensive drying reef, which fronts the eastern coast of Tumbatu. About 4 miles south-south-westward of Ras Nungwi, the fringing reef extends about 1½ miles offshore and has on it two islets, the northern and larger of which is called Daloni. The narrowest part of the channel, 3 cables wide, in which there is a depth of 5¾ fathoms ($10^{m}5$), lies north-eastward of Puopo, an islet about 4½ miles south-south-eastward of Mwana wa Mwana, on the edge of the reef fronting the eastern side of Tumbatu (*Lat. 5° 49′ S., Long. 39° 13′ E.*).

A red can buoy marks the north-eastern edge of a sand and coral spit which extends about 6 cables north-eastward of Puopo. On the eastern side of the channel, there lies a coral outcrop, with a least depth of a quarter of a fathom ($0^{m}5$) over it, about one mile east-north-eastward of the northern extremity of Puopo.

The southern entrance lying between Ras Kiyomoni, the south-western extremity of Tumbatu and Ras Uso wa Membe, has a bar across it with a least depth of 13 feet ($4^{m}0$). It is about three-quarters of a mile wide between the sandbank of Mmawali and the reef extending northward from Ras Uso wa Membe. There is an isolated shoal of one fathom ($1^{m}8$) close southward of the recommended channel. Within the entrance, about 2 miles north-eastward of Ras Uso wa Membe, there is a sandbank, which dries 2 feet ($0^{m}6$), on a reef in the centre of the channel, which leaves a narrow deep passage between it and Ras Mwanda.

A red can buoy is moored westward of the bar, about three-quarters of a mile north-north-westward of Ras Uso wa Membe (*Lat. 5° 54′ S., Long. 39° 11′ E.*).

A black barrel buoy, surmounted by a black metal flag, about one mile northward of Ras Uso wa Membe, marks the northern side of the channel across the bar and a similar buoy marks the northern edge of the sandbank extending from Ras Mwanda.

A red barrel buoy, surmounted by a red metal flag, marks the southern extreme of the reef lying in the centre of the channel.

A tongue of sand and coral, with depths of less than one fathom ($1^{m}8$) extends three-quarters of a mile southward from the south-eastern extremity of Tumbatu.

Port limits.—The limits of the port of Mkokotoni are defined as follows:—On the north, by an imaginary line joining Ras Nungwi and Mwana wa Mwana lighthouses; on the west, by an imaginary line joining Mwana wa Mwana and the northern extreme of Ras Uso wa Membe, and including the coasts and landing places of Tumbatu and Mwana wa Mwana, and on the south and east, by the coast of Zanzibar island.

Tidal streams.—Anchorages.—Attention is called to the notes on tidal streams and currents in the Zanzibar channel on page 350. In Mkokotoni harbour, the general direction of the tidal stream of the rising tide, is southward, and that of the falling tide, northward, but both tidal streams are much influenced by the winds, and, during the south-west monsoon, there is, at neaps, a continuous north-going current. The tidal streams are strongest off Ras Mwanda.

Charts 664, 669, 597, 748b, 2483.

Chart 640b.

Good anchorage may be obtained in Mkokotoni harbour outside the 6-fathom ($11^{m}0$) line southward of Puopo and northward of a line joining Mkokotoni village and the south-eastern point of Tumbatu. The nature of the bottom is mud and the holding ground good. Native vessels anchor close inshore between the villages of Mkokotoni and Potoa (*Lat. 5° 51′ S., Long. 39° 16′ E.*).

Directions.—To enter by the northern entrance, from about 3 miles northward of Ras Nungwi, vessels should steer for Mwana wa Mwana lighthouse, bearing 224°, until Pale hill bears 182°, when it should be steered for on that bearing, keeping a good lookout for the edge of the reef extending from the coast southward of Ras Nungwi, which can generally be seen. When Kigunguli hill bears 120°, course should be altered to 168°, keeping a good lookout for the edge of the reef extending north-eastward from Puopo, which is marked by the red can buoy mentioned above. When the southern extremity of Puopo is open eastward of the eastern extreme of that islet, course should be altered to bring the white house close westward of Mkokotoni village, ahead, bearing 188°. When abreast the centre of Puopo all dangers will have been passed and anchorage may be obtained as convenient.

There is, at times, a considerable swell northward of Puopo, but it is not felt in the harbour southward of the narrows.

As there are no good leading marks through the southern entrance, vessels must be guided by eye and by the chart. The buoyage is maintained in a good state of repair and will lead vessels clear of all dangers. As the tidal streams, both on the ebb and flood, do not always run true with the channel, caution must be exercised.

Coast.—Light.—Off-lying dangers.—Between Ras Uso wa Membe and Mangapwani, a village, not visible from seaward, the coast consists of sandy bays and beaches with low rocky cliffs. Within the coast, the land rises gradually and is thickly covered with trees.

A light is exhibited, at an elevation of 120 feet ($36^{m}6$), from a white square tower with a red base, 76 feet ($23^{m}2$) in height, situated on a cliffy point about 3½ miles southward of Ras Uso wa Membe (*Lat. 5° 54′ S., Long. 39° 11′ E.*).

There is a conspicuous white government rest house, standing back from the cliff edge, about 2½ miles southward of the light.

Westward of Ras Uso wa Membe, lie Glenday patches, a 10-fathom ($18^{m}3$) bank of coral and sand with numerous pinnacles under 6 fathoms ($11^{m}0$). The least depths on this bank are 3¼ fathoms ($5^{m}9$), about 2 miles and four depths of 3¾ fathoms ($6^{m}9$), between 2 and 3½ miles respectively, north-westward of Mangapwani lighthouse. A deep channel, with a least depth of 9 fathoms ($16^{m}5$) and a width of 4 cables, runs between Glenday patches and the reef fringing the coast.

Chart 665.

Yambwa Ngome consists of two flat reefs which lie about 3 and 5 miles, respectively, westward of Mangapwani. Both reefs have a least depth of one to 3 feet ($0^{m}3$ to $0^{m}9$). The western reef is steep-to all round, as is the eastern one except on its southern side. Both reefs are easily seen owing to the discoloured water over them.

Fawatu is an extensive reef lying about 5½ miles south-westward of Mangapwani. It dries in patches, especially at its northern and southern extremes, and at 6 cables from its southern end, there is

Chart 665.

a sandbank, which dries 9 feet ($2^{m}7$). This reef is easily distinguished but must be approached with caution.

Charts 3211 and 665.

NORTHERN APPROACH TO ZANZIBAR HARBOUR.—Coast.—Off-lying danger.—Light-buoy.—Between Mangapwani and Bet-el-Ras, a low, rocky point about 8 miles southward, low, rocky cliffs continue to alternate with sandy bays and beaches. Bububu house, a white house, with a dome near it, stands near the mouth of a small stream, about one mile northward of Bet-el-Ras; water is conveyed to the coast, by an aqueduct close to Bububu house, but it is unfit for drinking.

A white palace, with a red roof surmounted by a flagstaff, stands on the coast about 4 cables northward of Bet-el-Ras, and is the most conspicuous mark in the northern approach to Zanzibar harbour. *See* view A on chart 665.

There is a conspicuous clock tower on the school at Bet-el-Ras (*Lat. 6° 07′ S., Long. 39° 13′ E.*).

Seagull shoal, a small shoal of black sand and coral, lies in the fairway of the northern approach to Zanzibar harbour, about 2¼ miles north-north-westward of Bet-el-Ras; it has a least depth of 1½ fathoms ($2^{m}7$) over it, and of 4 fathoms ($7^{m}3$) close around it.

A conical light-buoy, painted red and surmounted by a spherical topmark, and exhibiting a *white flashing* light, is moored on the southern side of Seagull shoal.

The clock tower in Zanzibar town in line with the north-western end of Chapani, described below, bearing about 180°, leads close eastward of Seagull shoal.

Passes in the northern approach.—From northward, Zanzibar harbour may be approached through three passes in the chain of islets and reefs which extends westward from the coast near Bet-el-Ras. Great pass, the westernmost pass, lies between Chango, an island about 2½ miles westward of Bet-el-Ras, and Danzi (*Lat. 6° 06′ S., Long. 39° 08′* E.), a reef about 1½ miles north-westward of Chango. It is the widest and deepest channel into the harbour, but it is not buoyed and no leading marks can be given, and for these reasons, English pass is to be preferred.

French pass lies between Chango and Kepandiko, an islet about three-quarters of a mile eastward. It has a very narrow channel, with a least depth of 4 fathoms ($7^{m}3$), but it is not recommended, as there are no satisfactory leading marks.

English pass lies between the coast and the shoal extending eastward of Chapani, an island about 1¼ miles west-south-westward of Bet-el-Ras. It has a least depth of 6 fathoms ($11^{m}0$), and is about 2 cables wide at its narrowest part, but the channel is buoyed and lighted, and English pass is generally used by vessels approaching Zanzibar harbour from northward.

Islands and dangers on the western side of English pass.—Beacons.—Light-buoy.—Danzi is a small, coral reef, drying one foot ($0^{m}3$), situated about 4 miles west-north-westward of Bet-el-Ras; it lies on a 3-fathom ($5^{m}5$) bank which extends about 5 cables northward and about 2 cables westward, of the reef.

Chango, an island, about 20 feet ($6^{m}1$) high, lies about 2½ miles

Charts 640b, 664, 662, 597, 748b, 2483.

Charts 3211 and 665.

westward of Bet-el-Ras. The quarantine and isolation station, a large building, stands on its northern coast, and there are two Government bungalows and a flagstaff at the eastern end of the island, which are all noticeable when seen from northward. A 3-fathom (5^{m}5) shoal, with a rock, awash, near its northern end, extends nearly one mile northward of Chango, and a long, narrow tongue, on which the depths vary from 1¼ to 4 fathoms (2^{m}3 to 7^{m}3), with some rocks, awash, extends nearly 2 miles southward of the island.

Chart 3211.

A beacon, consisting of a white post, stands at the centre of the northern coast of Chango; another beacon, consisting of a white staff, surmounted by a triangle, stands nearly one cable south-westward of the front beacon. These two beacons, in line and bearing 226°, lead to the quarantine anchorage north-eastward of Chango.

Kepandiko is an islet standing on a reef, the inner part of which dries 4 feet (1^{m}2), in places, about three-quarters of a mile eastward of Chango. When examined in 1900, the reef, northward of Kepandiko, was reported to have risen some 2 or 3 feet (0^{m}6 to 0^{m}9) since the previous examination in 1873.

Chapani is a low, bush-covered island, about 5 cables eastward of Kepandiko, the two islands being connected by a narrow strip of drying sand; it is uninhabited and contains a British cemetery. From northward, Chapani is not easily distinguished, owing to the higher land near the town of Zanzibar, appearing behind it.

The reef which surrounds both Kepandiko and Chapani (*Lat. 6° 08′ S., Long. 39° 11′ E.*), extends about three-quarters of a mile eastward and southward of those islands, and, unlike other reefs in this locality, has a number of shoal patches and rocks, near its outer edge.

A conical light-buoy, painted in black and white chequers and exhibiting a *red quick flashing* light, marks the edge of the sunken reef extending eastward of Chapani, about three-quarters of a mile south-south-westward of Bet-el-Ras.

Charts 3211 and 665.

Eastern side of English pass.—Buoys.—Lights.—The eastern side of English pass is formed by the coast of Zanzibar island between Bububu house and the harbour.

Chart 3211.

Between Bet-el-Ras and Ras Shangani, about 3 miles south-south-westward, the coast forms a slight bight, and is fronted by Malindi spit, a drying bank which extends over 6 cables offshore in places.

The village of Mtoni is situated about one mile southward of Bet-el-Ras, and near the village are two large white buildings; fronting the village is a small, square, white building, which is used as a mosque. The ruins of Marhubi palace lie about half a mile southward of the village of Mtoni, and midway between these ruins and Ras Shangani is the entrance to Pwani ndongo, a salt water inlet, which dries. South-westward of the entrance to Pwani ndongo are the harbour works and town of Zanzibar.

The light, exhibited from the clock tower in the town, is described on page 377.

Leading lights are established south-south-eastward of Bet-el-Ras. The front light is exhibited, from a beacon, 20 feet (6^{m}1) in height,

Chart 3211.

situated on the foreshore, about 3½ cables south-south-eastward of Bet-el-Ras. The rear light is exhibited, from a beacon, 42 feet (12^{m}8) in height, situated about 1¼ cables north-eastward of the front light.

These two lights, in line astern bearing 042°, lead through English pass to the harbour of Zanzibar, passing north-westward of Malindi spit. The rear beacon is obscured northward of a bearing of 087°.

Leading lights are also established near Marhubi palace. The front light is exhibited, at an elevation of 32 feet (9^{m}8), from a white, pyramidal, stone tower, 20 feet (6^{m}1) in height, situated on the coast, about 2½ cables northward of Marhubi palace (*Lat. 6° 09′ S., Long. 39° 12′ E.*). The rear light is exhibited, at an elevation of 93 feet (28^{m}3), from a white framework structure on a white, square, stone tower, 42 feet (12^{m}8) in height, situated about 2 cables southward of the front light. These two lights, in line bearing 168°, lead through the entrance to English pass, and up to the line of the Bet-el-Ras leading-lights.

Charts 640b, 665.

Directions (continued from page 351).—Vessels should pass about three-quarters of a mile off Mangapwani lighthouse, thence steering parallel with the coast at about that distance from it, passing eastward of Seagull shoal and avoiding the bank which fringes the coast between Bububu house and Bet-el-Ras. The beacons near Marhubi palace, in line and bearing 168°, lead eastward of Seagull shoal; when seen, they should be steered for on that bearing, and vessels should keep on this line until the beacons near Bet-el-Ras are in line, bearing 042°, the latter beacons should then be kept in line astern, and vessels steered 222° for the anchorage.

If passing westward of Seagull shoal, vessels should bring Kepandiko in line with the large, square building on Ras Shangani, described on page 377, bearing 174°, and should keep on this line until the small, square, white house at Mtoni bears 145°, when the latter should be steered for on that bearing until the Marhubi palace beacons are in line, when the directions given above should be followed.

Charts 3211 and 665.

ZANZIBAR HARBOUR.—Port limits.—Zanzibar harbour lies fronting the sandy promontory of Ras Shangani, on which stands the town of Zanzibar, and as the buildings are of a dazzling white colour, the town is conspicuous from northward or southward. The largest buildings are on the northern side of Ras Shangani, but there are others on the southern side, and, in addition to those already mentioned, the Sultan's palace, from which a red flag is displayed from a flagstaff westward of it, is situated about 3 cables north-eastward of the extreme of Ras Shangani; southward of the palace are the Government offices, surmounted by a clock tower, which is conspicuous, and in front of these is the Custom House and its wharf. The official residence of the British Resident is about 3½ cables south-eastward of Ras Shangani (*Lat. 6° 10′ S., Long. 39° 11′ E.*).

The limits of the port of Zanzibar, under the jurisdiction of the Harbour Authorities are indicated by pecked lines on Charts 3211 and 665.

Port regulations.—The following extracts are from the regulations in force at the Port of Zanzibar:—

Charts 664, 669, 597, 748b, 2483.

Charts 3211 and 665.

Every ship or native vessel, on arrival at the port, shall avoid anchoring in such a position as to obstruct the fairway.

Every ship on entering or leaving the port shall display her national ensign, and shall continue to display the same when in port from 0800 to sunset.

All ships entering the port shall display the quarantine signals prescribed by the International Code of Signals, and shall show them until they have received pratique.

All ships entering the Port, having on board any passengers, shall, if entering during the day, display " I " flag of the International Code of Signals, and, if entering during the night, shall exhibit a *white* light immediately below the quarantine lights, until the Immigration Officer has permitted the passengers to land.

All ships arriving in the port shall anchor clear of all mooring buoys and of all ships in the port. Large ships shall bring to on the outside of the anchorage, and small ships, nearer the shore. All ships within the port shall take up such berths as may be appointed for them by the Port Officer, and shall change berth if and when required by him.

Ships laden, or part laden, with gunpowder, kerosene, oil, petrol or any other explosive, or dangerous material whatsoever, shall comply with the provisions of the Dangerous Goods Decree (Chapter 97 of the revised Laws of Zanzibar 1922) and any rules made thereunder.

The Port Officer, or any person generally or specially authorised by him, may at any time board any ship in the port, and inspect it or any part of it.

No person may, except by permission of the Port Officer, board or leave a ship while such ship is in motion, nor may any person board or leave a ship, except by means of the gangway or an efficient pilot ladder.

Oil-carrying ships shall not pump their bilges within the port.

Ships may be disinfected by the Clayton gas apparatus on application to the Port Officer. Instructions concerning the necessary measures to be carried out preparatory to disinfection, shall be furnished by the Port Officer on application therefore.

No steam sirens, whistles or fog horns, shall be used within the limits of the port, save for the purpose of navigation.

No hawsers, ropes or lines shall be run from any ship in port for a greater distance than 50 yards.

No master of a ship shall cause or permit any carcase, manure, excreta, rubbish, ashes or refuse of any kind, to be thrown overboard in the port.

Charts 665 and 640b.

Pilotage.—The approaches to Zanzibar harbour, though narrow, are not dangerous. Pilotage is not compulsory and only extends as far northward as Mangapwani lighthouse and as far southward as Chumbe lighthouse. Pilots are available, if reasonable notice is given to the Port Officer. Mariners, unfamiliar with these waters, are very strongly advised to employ a pilot.

Chart 3211.

Anchorages.—Light-buoys.—Dangers.—Good anchorage may be obtained, in depths of from 7 to 12 fathoms ($12^{m}8$ to $21^{m}9$), either northward or southward of Ras Shangani, in any position, except within the prohibited anchorage described below.

Chart 3211.

Vessels of war may anchor or moor in any position reserved for them by the Port Officer.

Five numbered anchorage berths, which are allotted by the Port Officer to vessels of over 300 feet (91^{m}4) in length, in either monsoon, are shown on the chart, northward of Ras Shangani (*Lat. 6° 10′ S., Long. 39° 11′ E.*). The approach to No. 2 berth is marked by leading lights, *see* page 390, the alignment of which is indicated by a pecked line on the chart. There is a mooring buoy about one cable southward of Ras Shangani.

Two light-buoys painted in red and white vertical stripes and red, and each exhibiting a *white flashing* light *every second* are moored about 9 and 13 cables respectively, north-eastward of Ras Shangani. These buoys mark the north-western limit of the anchorage for native vessels, which is bounded on the south and east by Malindi spit, and on the north and west, by an imaginary line drawn from the western end of Malindi breakwater, through the two light-buoys, and thence to the front Marhubi light-beacon (*Lat. 6° 08′ S., Long. 39° 13′ E.*).

A 4½-fathom (8^{m}2) patch, with depths of 6 fathoms (11^{m}0) close-to, lies about 3½ cables northward of Ras Shangani, and a 3-fathom (5^{m}5) patch, lies nearly 4 cables north-north-eastward of Ras Shangani.

Prohibited anchorage.—Quarantine anchorage.—On account of submarine cables, vessels are prohibited from anchoring in an area westward of Ras Shangani, which is indicated by pecked lines on the chart. The limits of this area are marked by two white, masonry pillars standing on the sea wall in front of the Cable and Wireless Company's station at Shangani, which lines bear 066° and 111°, respectively, with a flagstaff surmounted by a black square slatted topmark, situated on the roof of the same building, close to the extremity of Ras Shangani. These alignments should not be relied on for the adjustment of compasses.

The Quarantine anchorage is in French pass, north-eastward or south-eastward of Chango, according to the monsoon.

Wharf.—Depths.—Lights.—Boat camber.—About half a mile north-eastward of Ras Shangani is a reclaimed area which extends northward of the town, on the western side of which, is a wharf, 800 feet (243^{m}8) in length. There is a least depth of 24 feet (7^{m}3) alongside its northern end, and of 21 feet (6^{m}4) for 450 feet (137^{m}2) from its outer end; the depths thence decrease rapidly to 10 feet (3^{m}0), and for the next 200 feet (61^{m}0), there is a least depth of 7 feet (2^{m}1) alongside; thence to the southern end of the wharf, there is a least depth of 4 feet (1^{m}2) alongside.

Westward of the outer end of the wharf, the depths increase rapidly to over 5 fathoms (9^{m}1).

Use of the wharf should be restricted to vessels of a draught of 18 feet (5^{m}5) during springs, and to vessels of a draught of 20 feet (6^{m}1) during neaps.

A light is exhibited, at an elevation of 16 feet (4^{m}9), from a black and white iron column, 10 feet (3^{m}0) in height, situated on the north-western end of the wharf.

A breakwater, 600 feet (182^{m}9) in length, is situated about one cable northward of the northern end of the wharf, and, during northerly winds, shelters a boat camber on the north-eastern side of the reclaimed area. There are depths of 24 feet (7^{m}3), at the entrance to

Chart 3211.

the camber between the northern end of the wharf and the western end of the breakwater, and there is a least depth of 6 feet (1^m8) at the landing steps in the camber. Passengers from all ships at the anchorage, are required to land at these steps. On the southern side of the camber, there is a wharf for dhows, and farther eastward, lighters discharge coal.

A light is exhibited, at an elevation of 20 feet (6^m1), from a black, framework, steel structure on a white concrete base, situated at the western end of the breakwater.

Piers.—Lights.—There are several short piers and landing places between the Residency pier and Ras Shangani (*Lat. 6° 10′ S., Long. 39° 11′ E.*) and also close northward of that point.

A light is exhibited, at an elevation of 62 feet (18^m9), from the roof of a building on the harbour front, about 4 cables north-eastward of Ras Shangani.

A light is exhibited, at an elevation of 210 feet (64^m0), on a radio mast situated about 5 cables east-south-eastward of Ras Shangani.

The above two lights, in line bearing 162°, lead towards No. 2 anchorage berth (*see* page 389).

A light is exhibited, when required, from the Residency pier, about 3½ cables south-eastward of Ras Shangani ; two lights are exhibited from a landing pier, about 1½ cables south-eastward of Ras Shangani ; a light is exhibited from a pier, about half a cable north-eastward of Ras Shangani.

Port facilities.—There are several cranes at the harbour works, of which the largest is on the wharf and is of 5 tons lifting capacity.

There are two tugs and several lighters at the port.

Repairs.—Very small repairs might be effected by the Public Works department, and small craft can be beached in safety.

There are two slipways, known as Malindi slipways Nos. 1 and 2. For details of the larger, *see* Appendix II.

Supplies.—A small stock of coal is maintained. Coal is taken in at the anchorage by baskets from lighters, at a rate of about 30 tons per hour.

Water is laid on to the wharf, and can be supplied to vessels at the anchorage by water boats.

Fresh provisions are plentiful, including vegetables, except between the months of December and April.

Town.—The town of Zanzibar, called by the natives, Unguja, appears somewhat imposing when seen from westward, owing to the large buildings close within Ras Shangani, but behind these, the town is mainly composed of mud huts and dilapidated coral houses ; at high water, the promontory on which the town is built, is nearly converted into an island by Pwani ndongo.

In 1948, the population was 45,275.

The port is the centre of a large trade with the mainland of Africa. During the year 1950, 301 ocean-going vessels, of a net registered tonnage of 1,441,565 tons, entered the port ; in addition, a total number of 386 coasting vessels with a net registered tonnage of 162,088 tons, and 3,349 native vessels with an aggregate tonnage of 112,709 tons entered the port.

There is one hotel for Europeans.

Charts 665, 664, 669, 597, 748b, 2483.

Chart 3211.

There are several Government hospitals in the town, including a hospital for Europeans, with a moderate number of beds.

Deratisation.—*See* page 38.

Communications.—There is regular communication by sea with Europe, South Africa, and India, also with Pemba and Dar-es-Salaam.

Zanzibar is connected to the general telegraph system.

There is a regular air service between Zanzibar and ports on the east coast of Africa, and with Europe and South Africa via Mombasa.

Climatic table.—*See* page 79.

Charts 640a and b.

Directions for leaving Zanzibar harbour.—Power vessels leaving Zanzibar harbour, will naturally use either English or Southern pass, whichever is the more direct channel for their destination. If bound for Bagamoyo, after passing through Southern pass, vessels should bring Hatajwa hill in line with the southern extreme of Chumbe, bearing 078°, which mark, astern, leads between the reefs of Boribu and Tambare, whence they should proceed as directed on page 364.

Chart 640a.

EASTERN COAST OF ZANZIBAR ISLAND.—Coast.—Off-lying bank.—Light.—Between Ras Kizimkazi (*Lat. 6° 29′ S., Long. 39° 30′ E.*), described on page 473, and Ras Makunduchi, about 7½ miles north-eastward, the coast consists of low, level cliffs, 15 to 20 feet (4^{m}6 to 6^{m}1) high, backed by hills which gradually rise to an elevation of about 70 feet (21^{m}3); about 5 miles north-eastward of Ras Kizimkazi, the cliffs cease, and the coast thence to Ras Makunduchi consists of a sandy beach.

This stretch of coast is fringed by a drying coral reef, which extends between 3 and 8 cables offshore, and is steep-to.

Kizimkazi patch is a bank of sand and coral, with depths of from 6 to 9 fathoms (11^{m}0 to 16^{m}5) on it, situated nearly one mile offshore, about 4 miles eastward of the southern extreme of Ras Kizimkazi; there are depths of 35 fathoms (64^{m}0) in the channel between Kizimkazi patch and the coast.

In 1953, a lighthouse was under construction and nearing completion about 2½ miles south-south-eastward of Ras Makunduchi.

Chart 640a and b.

Between Ras Makunduchi and Michamvi, a low, rounded point covered with coconut palms, about 12 miles northward, the coast consists of a sandy beach close within which are several villages, thence for about 4½ miles north-north-westward to Chwaka head, it is generally rocky. The fringing reef extends nearly 2 miles offshore in places between Ras Makunduchi and Chwaka head, and is steep-to.

Chwaka bay.—Dangers.—Anchorage.—Chwaka bay is a large bay lying between Chwaka head and Ras Urua, about 5 miles north-westward, but the depths in it are so shoal that it affords no sheltered anchorage. Chwaka head is bold and cliffy, and the land close within it rises to an elevation of about 70 feet (21^{m}3). The shores of the bay are low and consist of sandy beaches and mangrove swamps. Chwaka, at the south-western corner of the bay, is the largest of several villages in this vicinity; northward of Chwaka, are three large bungalows which are used as health resorts by the Sultan and residents of Zanzibar town. Several low, steep, isolated hillocks may be seen

Charts 665, 664, 669, 597, 748b, 2483.

Chart 640a and b.

rising above the surrounding vegetation within the western shore of the bay.

Chwaka head is fringed by a drying reef, which extends about 1½ miles northward, but its outer edge is not steep-to, and as the water in this vicinity is thick and muddy, the reef must not be approached too closely.

The head of the bay is completely filled by a drying reef, which is fronted by a 3-fathom (5ᵐ5) bank which nearly fills the outer part of the bay. A reef, which dries one foot (0ᵐ3), on which the sea generally breaks, lies on the outer edge of the above bank, about 2½ miles north-westward of Chwaka head.

Temporary anchorage may be obtained, in a depth of 5 fathoms (9ᵐ1), sand, between Chwaka head and the drying reef, north-westward of it, with the north-eastern extreme of the coast near Chwaka head, bearing 137°, about 5 cables north-westward of the edge of the fringing reef.

The tidal streams set strongly in and out of Chwaka bay.

Chart 640b.

Coast-Off-lying islet.—Anchorage.—For about 15 miles north-north-westward of Ras Urua (*Lat. 6° 04′ S., Long. 39° 26′ E.*), the coast is low and sandy and is backed by rising ground a few miles inland; thence, for about 7½ miles north-north-westward to Ras Nungwi, described on page 380, the coast is composed of low cliffs and sandy bays, alternately.

The drying coral reef which fringes this stretch of coast, extends between half a mile and 1½ miles offshore, and is steep-to, depths of 30 fathoms (54ᵐ9), being found about half a mile from its edge; the sea always breaks heavily on the northern part of this reef. At the corners of a sandy bay, close northward of Ras Urua, are the villages of Mdudu and Pongwi (*Lat. 6° 02′ S., Long. 39° 24′ E.*).

Mwemba is a small sandy islet, covered with tall casuarina trees, situated nearly 1½ miles offshore, about 8 miles south-eastward of Ras Nungwi. The islet stands on the western edge of an extensive drying coral reef which is steep-to, and which is separated from the coast by a channel with depths of 50 fathoms (91ᵐ4).

In 1918, it was reported that the western side of the islet had extended westward about one cable (182ᵐ9).

Mwemba is frequented by fishermen and good water may be obtained from a masonry well at its centre.

During the south-west monsoon, good anchorage may be obtained, in a depth of 10 fathoms (18ᵐ3), sand, about three-quarters of a mile northward of the islet.

Charts 665, 664, 669, 597, 748b, 2483.

CHAPTER X

PANGANI BAY TO RAS NGOMENI, INCLUDING PEMBA CHANNEL AND ISLAND

Chart 1390.

PEMBA CHANNEL.—Current and tidal streams.—Pemba channel is the channel which separates the island of Pemba from the mainland. Its southern entrance lies between Ras Kikogwe, described on page 368, and Ras Miugani, the southern extreme of the outermost island off the south-western coast of Pemba, about 38 miles eastward, and its northern entrance lies between Ras Kilifi, about 42 miles north-north-eastward of Ras Kikogwe, and Ras Kigomasha (Kegomacha), the north-western extreme of Pemba, about 28 miles eastward of Ras Kilifi. There are numerous off-lying reefs on the western side of the channel, which slightly contract its width, but the centre of the channel is free of dangers, and at its northern entrance, which is its narrowest part, the width of the navigable channel is about 19 miles. The depths throughout Pemba channel are very great, and both sides of the channel are steep-to.

In the channel, the current sets constantly northward, its direction in mid-channel varying from north-north-westward in the southern part, through north to north-north-eastward at the northern end ; its rate varies with the monsoons, being from 2 to 4 knots during the south-west monsoon and up to 2 knots during the north-east monsoon. When running at full strength, the current frequently causes ripples, which, near the western coast of Pemba, resemble breakers.

In the southern part of the channel, the constant northward-going current is never overcome by the tidal stream, but the effect that the latter has on the current, has not been ascertained. In the northern part of the channel, however, near the coast of Pemba, the tidal stream of the rising tide sets southward and neutralises, and at times overcomes, the constant north-going current, while the tidal stream of the falling tide increases it.

The tidal streams meet off the island of Uvinje (*Lat. 5° 07′ S., Long. 39° 38′ E.*), about 15 miles southward of Ras Kigomasha and cause a confused sea, which, at times, is dangerous to boats.

Throughout the channel, less current is at all times experienced, near the coast of Pemba, than in mid-channel.

General directions.—The eastern side of the channel is generally considered safer than the western side, as less current is experienced, and reefs extend only a short distance off the coast of Pemba, enabling vessels to approach close to the land for checking their positions. On the other hand, Pemba is notorious for its large rainfall, and is

Charts 664, 669, 597, 748b, 2483.

Chart 1390.

frequently enveloped in rain squalls and clouds when there is clear weather on the western side of the channel.

Chart 1390, 664, 640b.

Power vessels proceeding northward through Pemba channel from Zanzibar channel, from abreast Mwana wa Mwana should shape course direct for Ras Kigomasha; this course should lead clear through Pemba channel, allowing for the strong northward-going current. *See* directions for leaving Zanzibar harbour on page 391.

Vessels approaching Pemba channel from northward, and able to make Pemba in daylight, are recommended to steer for Ras Kigomasha and to keep close to the western coast of Pemba until abreast Mesali (Mesale) an island about 23 miles southward of Ras Kigomasha, whence they should steer for Mwana wa Mwana, allowing about 2 points southward to counteract the set of the current. About 4½ miles northward of Mesali are three islets on a reef, described on page 402, which are conspicuous and easily identified, and are useful for checking the position; the reef extending southward of the islets, shows clearly with the sun westward.

With the aid of the light on Ras Kigomasha, vessels from northward may pass through Pemba channel at night in moderately clear weather, and even if the light be not sighted when expected, Pemba may be approached from northward at a moderate speed and with constant sounding; in such circumstances, however, a more prudent course is to keep well outside for the night, and approach at daylight.

Vessels which have entered Pemba channel from northward and do not wish to proceed to Zanzibar channel at night, may obtain good anchorage, in depths of from 6 to 7 fathoms ($11^{m}0$ to $12^{m}8$), on a bank extending southward of Mesali (*Lat. 5° 14′ S., Long. 39° 36′ E.*).

Chart 1390.

PEMBA.—General remarks.—Caution.—The island of Pemba, called by the Arabs El Huthera (the Green), lies north-eastward of Zanzibar island, Ras Upembe, its southern extreme, being about 29 miles east-north-eastward of Ras Nungwi. It is low, and, except in moonlight, it cannot be seen far at night. There is no main ridge, but most of the hills are of about the same elevation and nowhere exceed 300 feet ($91^{m}4$). The soil is rich and is covered with luxurious vegetation, the principal produce being cloves, most of which are cultivated on the western side of the island.

Pemba stands on a reef which is generally steep-to, and which extends less than one mile from the western coast or the off-lying islets; off the eastern coast, the reef extends about half a mile and is steep-to, with breaks opposite the several creeks which indent this coast and afford passage for boats in fine weather. The western side of the island is much indented and is fronted by numerous islands and drying reefs, within which sheltered anchorage may be obtained.

Chake Chake bay, situated eastward of the island of Mesali, *see* above, is the best harbour and is that most easy of access; it affords shelter in all winds for vessels of any description, although the depths in many parts of the bay are inconvenient for anchorage. Kingoji (Kingoje) bay, close southward of Chake Chake bay, and Port Cockburn, about 4 miles northward of Chake Chake bay, are good anchorages, as also is Port George, at the head of which is Wete harbour, but the two latter

Charts 669, 597, 748b, 2483.

Chart 1390.

harbours, about 8 and 10 miles, respectively, northward of Chake Chake bay, are not so easy of access. Port Kiuyu (*Lat. 4° 58′ S., Long. 39° 41′ E.*), about 6 miles southward of Ras Kigomasha, is also a good anchorage.

From the nature of the sea bottom off this coast, it is possible that small uncharted dangers may exist; vessels entering any of the anchorages in Pemba should therefore choose a time when the sun is in a favourable position, and should keep a good look-out aloft, although owing to the density of the water at times, sunken dangers are not always discernible from the masthead.

Current.—The main northward-going current divides southward of Ras Upembe and follows the line of the coast on either side of Pemba, running with a velocity of from about one knot during the north-east monsoon, to 3 knots during the south-west monsoon. There are heavy tide rips at the position where the current divides, especially during the period when it is met by the out-going tidal stream, running southward out of Upembe passage, a channel between the reefs, close south-westward of Ras Upembe. There are also tide rips, which extend for 2 miles northward, and occasionally overfalls, off Matumbe Makupa, an island about 10 miles west-north-westward of Ras Upembe.

Chart 1310.

SOUTH-WESTERN COAST OF PEMBA.—Off-lying reef.—Upembe passage.—Ras Upembe, the southern extreme of Pemba, is a bold point, 15 to 20 feet (4^m6 to 6^m1) high, within which the land is clear of bushes for about half a cable; it is steep-to, and the sea at times breaks heavily against the point. A small sandy beach on the western side of Ras Upembe is very distinctive from south-westward, and there are two white sandy beaches between one and 2 miles north-eastward of it, while on the coast, about 3 miles north-eastward, there was, in 1892, a conspicuous clump of trees, about 80 feet (24^m4) high.

Between Ras Upembe and the port of Mkoani, about 8 miles north-westward, the south-western coast of Pemba is fronted by an extensive detached reef, the greater part of which dries, and on which there are numerous islands and rocks. From close westward of Ras Upembe, the outer edge of this reef curves gradually westward and northward in a wide sweep to a position about 3½ miles westward of Mkoani, extending in places, over 4 miles from the coast; it is steep-to, and the sea always breaks on it. Between the reef and the coast, there is a narrow channel which is known as Upembe passage (*Lat. 5° 29′ S., Long. 39° 43′ E.*).

The southern entrance to Upembe passage lies between Ras Upembe and the eastern extreme of the reef, about 4 cables westward, and its northern entrance lies between the coast southward of Mkoani and the eastern extreme of the island of Makongwe (Makungwi), nearly 1½ miles south-westward of Mkoani. Although much used by dhows, the channel is encumbered with reefs, and at low water, springs, is almost blocked about one mile within its southern entrance.

About 1½ miles northward of Ras Upembe, there is a small harbour which is entered between Observation point, an overhanging cliff, with bushes fringing its edge, about 4 cables north-north-westward of Ras Upembe, and South Ras Domoni, a similar point about 1½ miles north-westward. This entrance nearly dries, and there is another entrance, which dries, situated on the coast about 2 miles

Chart 1310.

north-eastward of Ras Upembe, which is known as the eastern entrance to Upembe passage; the latter entrance is marked by a coral islet, 20 feet ($6^{m}1$) high.

Islands and islets on the reef.—Hinsuani, and The Twins, are wooded islets, with overhanging coral cliffs, situated about 1¼ miles westward of Ras Upembe; Miugani, a thickly wooded islet, stands about one cable within the outer edge of the reef, about 3¼ miles westward of Ras Upembe.

Yombi, Panza (Pansa) and Matumbini (Matumbene), and three intermediate islands form practically one continuous island, extending from about one mile northward of Miugani for over 6 miles north-westward, these islands being only separated by mangrove creeks which are available for boats at high water. Ras Miugani (*Lat. 5° 29′ S., Long. 39° 39′ E.*), the southern extreme of Panza is a bold coral cliff, 40 feet ($12^{m}2$) high; it lies about one cable within the outer edge of the reef, about 6¼ miles westward of the islet of Miugani, and there is a noticeable white sand beach on its western side.

Panani, a wooded islet, situated near the edge of the reef, about 2¼ miles west-north-westward of Ras Miugani, has coral cliffs, which show white and are distinctive when seen from south-eastward and open clear of the larger island northward of it.

Matumbini, a large island about 5 miles north-westward of Ras Miugani, has on its south-western side, a long, white sand beach, backed by a grove of casuarina trees.

Sumwago is a bare coral islet, or rock, with overhanging cliffs, 20 feet ($6^{m}1$) high, situated near the edge of the reef, about 4 cables westward of the western extreme of Matumbini. There are several other islets and rocks on the reef southward of Matumbini but they are not easily distinguished unless close-to, whereas Sumwago stands out well and shows clear of Matumbini when seen from southward.

Matumbe Makupa, about 57 feet ($17^{m}4$) in height to the tops of the trees, lies about 3 cables north-westward of Matumbini; it is thickly wooded and has coral cliffs on its eastern side. Barue rock, covered with bushes and with sides of coral cliff, lies about one cable westward of Matumbe Makupa and close to the western extreme of the reef; it shows up clear of the latter island from both northward and southward.

Kwata, the north-westerly island on the reef, lies about 2 miles north-north-eastward of Matumbe Makupa; Middle islet, 16 feet ($4^{m}9$) high, shows prominently midway between Matumbe Makupa and Kwata.

Makongwe is an island lying near the north-eastern extreme of the reef, and at the northern entrance to Upembe passage. It is partly cultivated and has several low hills with some coconut palms, the tops of which were, in 1889, about 100 feet ($30^{m}5$) high.

Northward of Kwata and Makongwe the reef extends from one to 1½ miles, and is irregular and broken in places.

WESTERN COAST OF PEMBA.—Port of Mkoani.—Dangers.—The port of Mkoani is situated abreast the village of that name, which is noticeable from seaward, about 1½ miles north-eastward of the island of Makongwe. It is approached through a channel between reefs known as the Mkoani channel.

Charts 1390, 664, 669, 597, 748b, 2483.

Chart 1310.

Between the northern entrance to Upembe passage and North Ras Domoni, a point on the mainland, about 3½ miles northward, the coast is fringed by a drying reef which extends nearly 1½ miles off-shore in places ; the northern part of this reef is fronted by a 3-fathom ($5^{m}5$) bank, which extends as much as 2½ miles west-south-westward and 2 miles west-north-westward of North Ras Domoni.

A rock, awash, lies near the outer edge of the above bank, nearly 2½ miles west-south-westward of North Ras Domoni.

Two rocks, with less than 6 feet ($1^{m}8$), lie about 1¾ miles west-north-westward of North Ras Domoni.

As stated above, patches of detached reef and sunken rocks extend about 1½ miles northward of Makongwe.

Buoys.—Lights.—Beacon.—The northern side of Mkoani channel is marked by black buoys, and the southern side by red buoys ; owing to birds perching on the buoys, their tops are often whitened. Lamps are attached to certain of the buoys at night.

Leading lights are occasionally exhibited at Mkoani (*Lat. 5° 21′ S., Long. 39° 38′ E.*). The front light is exhibited, at an elevation of 10 feet ($3^{m}0$), from a black structure with white horizontal bands, 20 feet ($6^{m}1$) in height, situated about 14 cables north-north-eastward of the eastern extreme of Makongwe. The rear light is exhibited, at an elevation of 73 feet ($22^{m}2$), from a similar structure, about half a cable south-eastward of the front light. These lights in line, bearing 130°, lead through Mkoani channel between the buoys.

A beacon, surmounted by a ball, painted red, stands on a rock, with less than 6 feet ($1^{m}8$) over it, at the head of the port, about 4 cables north-eastward of the front light-structure.

Port limits.—The limits of the port of Mkoani are bounded on the north and west by an imaginary line drawn from North Ras Domoni to the outermost channel buoy ; on the south, by the islands of Kwata and Makongwe and the reefs contiguous thereto, and on the east, by the coast of the mainland.

Anchorages.—The anchorage for native vessels is in an area bounded by the arc of an imaginary circle, having a radius of half a mile from the Custom House at Mkoani.

Small vessels may obtain anchorage, in depths of about 10 fathoms ($18^{m}3$), about 1¼ miles northward of Pochin beach, which is near the northern extreme of Makongwe, with the western extreme of Makongwe bearing 205°, and its eastern extreme bearing 152° ; this anchorage should be approached with caution on the latter bearing.

Port facilities.—There is a pier at Mkoani, about 1¾ cables in length, available for boats at all states of the tide.

In 1948, the population was 883.

There is a native hospital at Mkoani.

Communications.—There is regular communication by sea with Zanzibar.

Kingoji bay.—Dangers.—Anchorage.—Kingoji bay is entered between North Ras Domoni and Ras Kingoji about 2 miles northward ; Ras Kingoji is low and is not easily identified from westward. Mwamba Kisima, a drying reef, fringes Ras Kingoji, extending about 1½ miles westward, and is fronted by a 3-fathom ($5^{m}5$) bank, which extends over half a mile westward of Mwamba Kisima, and is reported to be extending farther westward.

Charts 1390, 664, 669, 597, 748b, 2483.

Chart 1310.

The channel into the bay lies between the northern extreme of the 3-fathom (5^{m}5) bank, the southern side of which forms the northern side of Mkoani channel, and the southern extreme of the bank fronting Mwamba Kisima, and is only about 5 cables wide; a detached 4-fathom (7^{m}3) patch lies nearly in the middle of the entrance channel, about 1¼ miles north-westward of North Ras Domoni.

Within the entrance channel, the bay is much encumbered by shoals which restrict the space available for anchorage, but vessels of moderate size may obtain sheltered anchorage, in depths of 6 or 7 fathoms (11^{m}0 or 12^{m}8), mud, about 4 cables east-north-eastward of North Ras Domoni; large vessels may obtain anchorage farther out, in depths of 11 or 12 fathoms (20^{m}1 or 21^{m}9), about 7 cables south-south-westward of Ras Kingoji.

As no definite marks are available, the best time for entering the bay is in the afternoon, with the sun astern, and vessels must be navigated from aloft.

Chart 1812.

Coast.—Off-lying islands.—Between Ras Kingoji (*Lat. 5° 17′ S., Long. 39° 39′ E.*) and Njao gap, the entrance to Port Kiuyu, about 20 miles northward, the western coast of Pemba is fronted by a chain of islands on drying reefs, which extends north-north-eastward in an almost continuous line, being broken only by a few narrow, but deep, gaps in the reefs. The western coasts of these islands generally run nearly parallel with the outer edges of the reefs on which they stand, and, as the latter are steep-to, they may be closely approached in safety in clear weather.

The islands are generally low, flat, covered with trees and bushes and without any conspicuous features, and the larger islands are partly cultivated.

The tidal streams run strongly in all the gaps between the islands, except in Mesali gap, where the main tidal stream runs southward of the island of Mesali. Attention is called to the notes on current and tidal streams off the western coast of Pemba on page 393.

Within the chain of islands and reefs, the coast is very irregular and indented, with numerous islets, reefs and shoals, but there are several harbours in which sheltered anchorage for all classes of vessels may be obtained; these harbours are connected by channels between the inner islands and reefs, but the northern anchorages are better approached through the gaps in the outer reefs. The outer islands and reefs are described with the harbours to which they form the western side.

For continuation of the description of the western coast of Pemba from Njao gap, *see* page 407.

HARBOURS AND CHANNELS BETWEEN RAS KINGOJI AND NJAO GAP.—Chake Chake bay.—Caution.—Chake Chake bay is entered between Ras Kingoji and the island of Mesali about 4 miles north-westward, but its entrance channel is contracted to about one mile in width by reefs and shoals extending from both entrance points, and the bay is also encumbered by numerous reefs and shoals. There is, however, a least depth of 7 fathoms (12^{m}8) in the channel recommended for entering, and there are large, clear spaces in the bay, which afford good anchorage in convenient depths for all classes of vessels.

Charts 1390, 664, 669, 597, 748b, 2483.

Chart 1812.

The eastern part of the bay gradually narrows and terminates in a mangrove creek, at the head of which, about 7 miles east-north-eastward of Ras Kingoji, stands the town of Chake Chake; this creek is known as Chake Chake inlet, and the anchorage close westward of it is called the port of Wesha, the village of Wesha being situated on the northern side of the port, about 2½ miles westward of Chake Chake, to which it is connected by a road.

The examination of Chake Chake bay was not quite completed at the time of the survey in 1878, and it is possible that other dangers may exist in addition to those shown on the chart. A good look-out aloft should therefore be kept when entering the bay.

Between Ras Kingoji (*Lat. 5° 17′ S., Long. 39° 39′ E.*) and Ras Tundaua, a low mangrove point about 3 miles north-eastward, is Ngelema bay. Ras Tundaua is not very distinctive, but it may be identified by a large bungalow, situated about one cable within its extreme, and by a large white house, with a flagstaff, on its eastern side.

Chart 1812, plan of Wesha anchorage and approaches.

Ras Banani, about 2½ miles eastward of Ras Tundaua, is low and moderately clear of bush; near its extreme is a white chimney which is visible from the anchorage. Ras Banani forms the southern entrance point to Chake Chake inlet, which is mostly mangrove swamps.

Chart 1812.

The island of Mesali is low and covered with dense jungle. It stands on the northern part of a drying reef, which extends about 7 cables south-westward of the island; the northern and western edges of the reef are steep-to, but a 3-fathom ($5^{m}5$) bank extends about 5 cables off its south-eastern edge. Mesali is prominent from all bearings.

Mkumbuu peninsula is a narrow tongue of land which forms the northern side of Chake Chake bay and separates it from the harbour of Port Cockburn; it is of a uniform height and has numerous coconut and palmyra palms on it, and terminates in high mangroves, about 3 miles north-eastward of Mesali. Dongo Kundu, a wedge-shaped projection on the southern side of Mkumbuu peninsula, about 4 miles east-north-eastward of Mesali, is composed of bright red sandstone, and is conspicuous; there is a patch of red cliff, about half a mile north-westward of Dongo Kundu, which is conspicuous in some lights.

Between Mesali and the western extreme of Mkumbuu peninsula, is the entrance to Owen channel, which forms the main approach to Port Cockburn, and is described on page 402.

Port limits.—The port of Chake Chake comprises the area contained between the northern and southern shores of Chake Chake bay, eastward of an imaginary line joining Ras Tundaua and the western extreme of Mkumbuu peninsula.

Dangers in Chake Chake bay.—**Caution.**—Chake Chake bay and the anchorage off Wesha are encumbered with numerous reefs and shoals, a description of which would be confusing and the position of which can best be seen on the chart.

In 1934, it was reported that from 3 to 4 fathoms ($5^{m}5$ to $7^{m}3$) less depths than are shown on the chart, exist in the vicinity of positions between 9 cables south-eastward and 11 cables east-south-eastward, respectively, of Dongo Kundo.

Beacons.—**Buoys.**—Two leading beacons are situated on the

Charts 1390, 664, 669, 597, 748b, 2483.

Chart 1812.

northern shore, southward of the village of Kunguni, nearly 2 miles eastward of Dongo Kundu; they are about one cable apart, and are visible through a gap in the mangroves. These beacons in line, bearing 064°, lead between reefs extending northward of Ras Tundaua (*Lat. 5° 15′ S., Long. 39° 41′ E.*) and southward of Dongo Kundu.

Chart 1812, plan of Wesha anchorage and approaches.

Two white leading beacons are situated on the southern shore at Kilulu, about 5 cables south-westward of Ras Banani; they are visible through a gap in the mangroves when in line, bearing 122°.

Two white leading beacons are situated on the northern shore at Wesha, about half a mile northward of Ras Banani; the front beacon is surmounted by an inverted triangle and the rear beacon, by a triangle. These two beacons are in line when bearing 067°.

Two beacons, each painted red and surmounted by a red ball, are situated at the north-eastern extremities of two reefs, about 3 cables north-westward of Ras Banani, and mark the southern side of the channel leading to the anchorage off Wesha.

Chart 1812.

A can buoy, painted in red and white vertical stripes, is moored about 1¼ miles northward of Ras Tundaua, and marks the northern edge of a reef extending northward of Ras Tundaua.

Chart 1812, plan of Wesha anchorage and approaches.

A black buoy is moored on the northern side of the channel, about one mile westward of Ras Banani, and marks the southern extreme of reefs which extend south-westward of Kitambuu, an islet about 8 cables north-westward of Ras Banani.

Two black buoys are moored about 4 cables north-westward of Ras Banani, abreast the two red beacons, and mark the northern side of the channel leading to the anchorage off Wesha.

Chart 1812.

Anchorages.—During the north-east monsoon or in calm weather, temporary anchorage may be obtained, in depths of 6 or 7 fathoms ($11^{m}0$ or $12^{m}8$), on a bank which extends nearly 2 miles southward of the island of Mesali.

Anchorage may be obtained about 1½ miles north-north-eastward of Ras Tundaua, in depths of from 7 to 10 fathoms ($12^{m}8$ to $18^{m}3$), but the 3-fathom ($5^{m}5$), patch, shown on the chart about 4 cables eastward of this position, must be avoided, and attention is called to the lesser depths, which, in 1934, were reported to exist north-westward of this position.

Anchorage may be obtained, in depths of from 8 to 10 fathoms ($14^{m}6$ to $18^{m}3$) about 8 cables north-westward of Ras Tundaua. Should the surrounding dangers be visible, vessels may anchor a little farther eastward of the above position.

Anchorage may be obtained in Ngelema bay, in depths of about 8 fathoms ($14^{m}6$), with Ras Kingoji (*Lat. 5° 17′ S., Long. 39° 39′ E.*) bearing 230°, and the western 100-foot ($30^{m}5$) hill, situated about 2¼ miles southward of Ras Tundaua, bearing 124°.

Chart 1812, plan of Wesha anchorage and approaches.

The anchorage for native vessels is eastward of an imaginary line joining the islet of Kitambuu and the front leading beacon at Kilulu.

Chart 1812.

Directions.—Vessels should approach Chake Chake bay with Ras

Chart 1812.

Banani in line with Ras Tundaua, bearing 075°, and should keep on this mark until the western extreme of the Mkumbuu peninsula bears 019°, when the latter should be steered for on that bearing until the southern extreme of Mesali bears 261°.

From this position, if proceeding to the anchorage about 1½ miles north-north-eastward of Ras Tundaua, Mifuni hill, flat-topped, covered with coconut palms and moderately prominent and situated about 1½ miles north-north-eastward of Ras Banani, should be brought to bear 078°, and then steered for on that bearing. When the beacons southward of Kunguni are in line, bearing 064°, they should be steered for on that bearing until the north-eastern extreme of the island of Vikunguni, described on page 402, is in line with the western extreme of Mkumbuu peninsula; the beacons should then be opened, and vessels should keep slightly southward of the leading line until Kitambuu bears 095°, when course should be shaped for that islet, which will lead to the anchorage.

Chart 1812, plan of Wesha anchorage and approaches.

If proceeding to the anchorage off Wesha, vessels should continue to steer for Kitambuu, bearing 095°, until the beacons at Kilulu are in line, bearing 122°; these beacons should then be steered for on that bearing until the beacons at Wesha are about to come in line, bearing 067°, when course should be altered to bring them in line, ahead. When making this turn, vessels are advised to keep slightly northward of the two leading lines, where greater depths are to be found. Vessels should keep on the line of the Wesha leading beacons until the two red beacons, marking the southern side of the channel, are in line, when course should be shaped to pass through the channel, leaving the red beacons on the starboard hand and the black buoys on the port hand.

Chart 1812.

If proceeding to the anchorage north-westward of Ras Tundaua, from the position with the southern extreme of Mesali bearing 261°, course should be shaped to bring the northernmost house in Chake Chake, a large, castellated, but not prominent stone house, in line with a mangrove islet, situated eastward of Ras Banani in the centre of Chake Chake inlet, bearing 089°, which will lead to the anchorage.

If intending to anchor in Ngelema bay, having entered Chake Chake bay by steering for the western extreme of Mkumbuu peninsula, as directed above, when a conical hill, 255 feet ($77^{m}7$) high, situated about 1½ miles south-eastward of Ras Tundaua, bears 099°, it should be steered for on that bearing until Ras Kingoji bears 194°, when course should be altered to 124°, steering for the western of two hills, 100 feet ($30^{m}5$) high, on that bearing, which leads, between dangers on either side, to the anchorage.

Town.—The town of Chake Chake, situated at the head of Chake Chake inlet, contains Government offices and quarters, behind which it consists mainly of narrow streets of flimsy huts.

In 1948, the population was 3,014.

There is a native hospital with a European doctor and a nurse.

Fresh meat may be obtained, and fowls and ducks are plentiful, and good water may be obtained from a spring.

Limited supplies of fruit and vegetables may also be obtained at the anchorage north-westward of Ras Tundaua (*Lat. 5° 15′ S., Long. 39° 41′ E.*).

Charts 1390, 664, 669, 597, 748b, 2483.

Chart 1812.

Communications.—There is regular communication by sea with Zanzibar.

Chake Chake is connected by road to Mkoani and Wete.

Owen channel.—Mesali gap.—Owen channel is entered between the island of Mesali and the western extreme of Mkumbuu peninsula, and leads to the harbour of Port Cockburn ; it has a least depth of 7 fathoms ($12^{m}8$) in the fairway, and is about 2 cables wide at its narrowest part.

The western side of Owen channel is formed by Uta-wa-limani, a drying reef which extends for over 5 miles northward from a position about 4 cables northward of Mesali, and has several islands on its northern part. A group of islets, named Three Islets, which lie on the reef, about 4½ miles northward of Mesali is very noticeable. Vikunguni and Kashani, are rocky islands about half a mile and 1½ miles, respectively, north-eastward of Three Islets ; Mapanya, situated about 1¼ miles south-eastward of Kashani, is also rocky, and in 1878, had a few baobab trees, 30 feet ($9^{m}1$) high, showing prominently above the surrounding vegetation.

Mesali gap is the channel which separates Mesali from the southern end of Uta-wa-limani ; the channel is nearly 2 cables wide and the depths are great in mid-channel, but its sides are not steep-to and the channel is not straight. There are no leading marks for Mesali gap and it should only be used at low water and with the sun in a favourable position.

Dangers in Owen channel.—Buoys.—The eastern edge of Uta-wa-limani is fronted by a bank, about one mile in width, on which the depths vary from one to 3 fathoms ($1^{m}8$ to $5^{m}5$), and on which there are numerous sunken rocks. A black conical buoy is moored about one mile south-eastward of Mapanya, and marks the north-eastern extreme of the bank. A detached 1¼-fathom ($2^{m}3$) patch, lies on the northern side of the channel, about 1¼ miles southward of the southern extremity of Mapanya (*Lat. 5° 10′ S., Long. 39° 38′ E.*).

Mwamba Mkumbuu is a reef, the inner part of which dries, which fronts the western end of Mkumbuu peninsula and extends over 1½ miles south-westward of it ; there are isolated drying patches on its outer part, and its southern edge is not steep-to and is difficult to distinguish from southward.

A red can buoy is moored about 1¾ miles south-westward of the western end of Mkumbuu peninsula, and marks the south-western extreme of Mwamba Mkumbuu.

Directions.—No good leading marks can be given for Owen channel, but at low water and with caution, there should be no difficulty in navigating it. Care must be taken to avoid the 1¼-fathom ($2^{m}3$) patch, about 1¼ miles southward of Mapanya, and also a 2½-fathom ($4^{m}6$) patch, shown on the chart about 7 cables north-eastward of the north-western extreme of the Mkumbuu peninsula.

Port Cockburn.—Islands and dangers.—Port Cockburn is a capacious and sheltered harbour, the depths in which are sufficient for all classes of vessels. In some parts of the harbour, the depths are too great for convenient anchorage, but there are numerous bays and creeks indenting its shores, in which good anchorage may be obtained.

The harbour is encumbered with numerous reefs and shoals, the positions of which may best be seen on the chart.

Charts 1390, 664, 669, 597, 748b, 2483.

Chart 1812.

The Mkumbuu peninsula forms the southern side of Port Cockburn, and its northern side is formed by a chain of islands, with narrow channels between them, which extends west-south-westward from Ras Wangwa-wa-ngoma (Unga-wa-ngoma), a point on the mainland about 3¾ miles north-eastward of the north-western extreme of Mkumbuu peninsula, to the northern end of Uta-wa-limani.

Kokota (*Lat. 5° 08′ S., Long. 39° 38′ E.*), the westernmost of these islands, lies close north-eastward of Uta-wa-limani, its southern extreme being about 3 cables northward of Mapanya. Kokota is covered with moderately high vegetation, including a few palms, and has a reef extending 4 cables from its rocky western coast.

Funzi, an island lying about three-quarters of a mile eastward of Kokota, has a central plateau, 40 feet ($12^{m}2$) high, covered with high coconut and palmyra palms. The island has a well on its northern side and a cemetery on its eastern side. There is a leper settlement on Funzi.

Pembe, an island about a quarter of a mile eastward of Funzi, is somewhat like the latter island in appearance, but is more thickly fringed with mangroves. Some red cliffs at its south-western extreme are noticeable. Pembe stands on the outer part of a drying reef which fringes Ras Wangwa-wa-ngoma.

Entrances.—Kokota gap.—Beacons.—Port Cockburn may be entered from southward by Owen channel, which is described above, and which is the channel to be preferred ; from westward by Kokota gap, which leads from seaward through the outer reefs, and from northward, by Funzi channel, which leads between the islands of Kokota and Funzi, from the harbour of Port George. The channel between Funzi and Pembe, is only available for boats. In all these entrances the tidal streams are strong, and it is advisable to enter at slack water.

The island of Kokota lies abreast, but slightly within, a gap in the outer reefs. Kokota gap is the channel through the outer reefs which passes southward of Kokota, the channel northward of the island being known as Uvinje gap, which is described on page 405. Kokota gap is deep, and the drying edges of the reefs which form the sides of the channel are steep-to. Within the gap, there are two large coral shoals, situated about 5 cables, eastward and south-eastward, respectively, of Mapanya ; there is a least depth of 1¾ fathoms ($3^{m}2$) on the northern shoal, and of three-quarters of a fathom ($1^{m}4$) on the southern shoal.

Leading beacons are established on the western side of Kokota. The front beacon stands on the western coast of Kokota about 8 cables east-north-eastward of the eastern extremity of Kashani ; the rear beacon is situated about 3 cables eastward of the front beacon. These beacons in line, bearing 096°, lead through the centre of the gap in the outer reefs to the entrance to Kokota or Uvinje gaps.

Funzi channel.—Danger.—Beacons.—Buoys.—Funzi channel lies between the islands of Kokota and Funzi, and leads from Port Cockburn to Port George inside the outer reefs. There is a least depth of 4 fathoms ($7^{m}3$) in the channel, but there is a 2¾-fathom ($5^{m}0$) patch in mid-channel, about 7 cables southward of the northern extreme of Kokota (*Lat. 5° 08′ S., Long. 39° 38′ E.*).

The channel is marked by beacons and buoys, and is available for small power vessels.

Charts 1390, 664, 669, 597, 748b, 2483.

Chart 1812.

That part of the channel which lies between the northern extreme of Kokota and a shoal shown on the chart about 2 cables north-eastward, is no longer used; the channel, with a width of about one cable, lies eastward of the latter shoal, between it and the reefs, marked by beacons, about one cable farther eastward.

A leading beacon, consisting of a stone cairn, 12 feet ($3^{m}7$) in height, painted white with a black vertical stripe, is established on the reef off the eastern coast of Kokota, about 6 cables southward of the northern extreme of the island. The beacon, described on page 403 as the rear beacon for Kokota and Uvinje gaps, serves as a rear beacon for Funzi channel and is situated about 1¾ cables north-north-westward of the front beacon. These beacons in line, bearing 341°, can be seen through a gap in the trees, and lead between the reefs which extend southward of Funzi, and the coral shoals, eastward of Mapanya, to the southern entrance to Funzi channel.

A beacon, consisting of a red pole, surmounted by a ball, 6 feet ($1^{m}8$) high, stands on a reef on the eastern side of the channel, about 3½ cables east-north-eastward of the northern extreme of Kokota (*Lat. 5° 08′ S., Long. 39° 38′ E.*).

A framework beacon, painted red and surmounted by a ball, 6 feet ($1^{m}8$) high, stands on a reef on the eastern side of the channel, about 4½ cables north-eastward of the northern extreme of Kokota.

A red can buoy is moored about 6 cables westward of the southern extreme of Funzi, and marks the eastern side of the channel.

A black buoy is moored about 2½ cables north-eastward of the northern extreme of Kokota, and marks the western side of the channel.

Port George.—Islands and dangers.—Beacons.—Port George is a large harbour, somewhat similar to Port Cockburn, and has depths throughout which are sufficient for all classes of vessels, but it is not recommended for vessels of more than moderate draught. The port and town of Wete is situated in the north-eastern part of the harbour.

Port George is much encumbered by reefs and shoals, the positions of which may best be seen on the chart.

The islands of Uvinje and Fundu, standing on the outer reefs, form the western side of Port George, and its northern side is formed by the mainland which at Ras Ukenjwi (Ukunjwi), a point about 5½ miles north-north-eastward of the northern extreme of Kokota, extends to within 8 cables of the eastern coast of Fundu.

Uvinje is a rocky island lying on the outer reefs about one mile northward of Kokota. It is covered with thick scrub and small trees. On its western side, there are several sandy coves, where boats may land at high water.

Two small grass-covered rocks, 10 feet ($3^{m}0$) high, lie near the edge of the reef, south-eastward of Uvinje; the southern of these is a double rock, lying about 30 yards ($27^{m}4$) within the edge of the reef.

Fundu, the largest of the islands standing on the outer reefs, is over 5 miles in length, and is separated from Uvinje by a narrow gap, about 2 cables wide. The island is flat and without any conspicuous feature, with several small sandy bays on its western side; it is partly cultivated, and had, in 1878, large groves of palmyra palms.

Leading beacons are established on Fundu. The front beacon stands on the east coast about 2¼ miles south-westward of Ras Ukenjwi

Charts 1390, 664, 669, 597, 748b, 2483.

Chart 1812.

and the rear beacon about 2 cables westward of the front beacon. The beacons in line, astern, bearing 086°, lead into Wete anchorage.

Pasi (*Lat. 5° 07′ S., Long. 39° 39′ E.*), an islet standing on the western edge of a drying reef in the centre of the southern part of Port George, about 1¼ miles north-eastward of the northern extreme of Kokota, is about 20 feet (6ᵐ1) high, and is covered with scrub.

Entrances.—Uvinje gap.—Beacons.—Danger.—Port George may be entered from southward by Funzi channel, which is described above; from westward by Uvinje gap, which leads from seaward through the outer reefs, and which is the principal entrance, and from northward, by a channel between Ras Ukenjwi and the eastern coast of Fundu, which is approached through Fundu gap, *see* page 406. In the latter channel, the depths are shoal, and it is only available for vessels of about 10-foot (3ᵐ0) draught, and is not recommended.

Haramu passage, the narrow channel between Uvinje and Fundu, dries, but it affords passage for boats at half tide.

Uvinje gap is the channel between Kokota and the reef extending southward of Uvinje; it is a perfectly clear channel, and may safely be navigated with the sun in a favourable position.

Leading beacons, leading through the gap in the outer reefs to the entrance to Uvinje gap, are described on page 403.

North-eastward of Kokota, the eastern side of the channel is bordered by reefs, close eastward of a line joining Kokota and Pasi.

A 4-fathom (7ᵐ3) patch, lies on the eastern side of the channel, about 3½ cables north-north-westward of Pasi.

Wete harbour.—Port limits.—Buoy.—Beacons.—Wete harbour, at the head of which is Wete creek, is an inlet at the north-eastern corner of Port George, between Ras Ukenjwi and Ras Tungwe (Tungwi) about 2½ miles south-eastward.

The port of Wete comprises the area contained north-eastward of an imaginary line joining Ras Ukenjwi and Ras Bundani, about 2¾ miles south-south-eastward.

A red conical buoy is moored about 1½ miles westward of Ras Tungwe, and marks the south-eastern side of the channel leading to Wete harbour.

A beacon, painted red and surmounted by a red ball, stands on the edge of a reef about 6 cables westward of Ras Tungwe, and marks the southern side of the channel leading to Wete harbour.

A beacon, painted red and surmounted by a red ball, stands on the north-western edge of a drying reef, about 6 cables east-north-eastward of Ras Tungwe.

Anchorages.—Anchorage may be obtained in the southern part of Port George, in depths of about 12 fathoms (21ᵐ9), about 6 cables north-eastward of the northern extreme of Funzi, with the western extreme of Pembe bearing about 155°; small vessels may approach closer to Pembe on the same bearing, with the beacon on the reef eastward of the northern extreme of Kokota just open northward of that point.

Good anchorage may also be obtained northward of Pasi (*Lat. 5° 07′ S., Long. 39° 39′ E.*), in depths of about 8 fathoms (14ᵐ6), with Pasi bearing 213°, and Ras Gogoni, a point on the mainland about 1¾ miles east-north-eastward of Pasi, bearing 109°, distant about one mile.

Charts 1390, 664, 669, 597, 748b, 2483.

Chart 1812.

Within Wete harbour, there is secure anchorage in depths of 4 fathoms (7ᵐ3), about 4 cables northward of Ras Tungwe; vessels may also anchor westward of the latter position, where the depths gradually increase to 10 fathoms (18ᵐ3) about one mile westward, and anchorage may also be obtained outside the entrance to Wete harbour, about 1½ miles westward of Ras Tungwe, in depths of about 10 fathoms (18ᵐ3).

Directions.—Vessels entering Port George by Uvinje gap should approach with the leading beacons in line, bearing 096°, until the eastern extreme of Uvinje is open eastward of the southern extreme of that island; course should then be altered northward for the northern extreme of Kokota, and when the two 10-foot (3ᵐ0) rocks, on the reef south-eastward of Uvinje, are in line, vessels should steer direct for Pasi, bearing about 047°. When the eastern extreme of Kokota, Mapanya and Mesali are all in line, course should be altered to steer for Ras Ukenjwi, bearing about 014°, and vessels should keep on this line until the northern extreme of Uvinje is abeam, when course may be shaped for the buoy at the entrance to Wete harbour.

Town.—Pier.—The town of Wete is situated about half a mile within the northern shore of the harbour, at the entrance to Wete creek. A conspicuous white house, the residence of the District Commissioner, is situated on a bluff southward of Wete, about 1¼ miles east-north-eastward of Ras Tungwe (*Lat. 5° 04′ S., Long. 39° 42′ E.*).

In 1948, the population was 3,806.

There is a native hospital at Wete.

No fresh provisions or water are obtainable.

A jetty, about 500 feet (152ᵐ4) in length, projects from the shore close northward of the leading beacons.

Communications.—There is regular communication by sea with Zanzibar.

Port Kishi Kashi.—Islands and dangers.—Entrances.—Port Kishi Kashi is a small harbour in which the available anchorage space is considerably reduced by the drying reefs which fringe its shores and completely fill large parts of it, but in the south-eastern part of the harbour, where there is most anchorage space and no tidal stream is experienced, vessels of moderate draught may obtain anchorage in depths of from 6 to 10 fathoms (11ᵐ0 to 18ᵐ3).

The western side of the harbour is formed by the northern part of the island of Fundu and the southern part of Njao, an island separated from Fundu by a narrow channel, known as Fundu gap. The mainland extends to within about 3 cables of the eastern coast of Njao, and forms the northern side of the harbour.

Njao is covered with trees and bushes and is similar in appearance to Fundu; a rock, 30 feet (9ᵐ1) high, stands on the edge of the reef which fringes its western coast, about 1½ miles northward of Fundu gap.

Port Kishi Kashi may be entered from southward by the passage between Ras Ukenjwi and Fundu, which is described on page 405 and is not recommended, and from westward, by Fundu gap, which leads from seaward through the outer reefs and is the principal entrance. There is also a narrow passage leading northward to Port Kiuyu inside Njao, but the depths in this passage are shoal.

Fundu gap, the channel between the northern extreme of Fundu

Charts 1390, 664, 669, 597, 748b, 2483.

Chart 1812.

and the southern extreme of Njao, is deep and straight, but it is only about half a cable wide at its narrowest part, and its sides are not quite steep-to. Within the gap, the channel leading to the harbour is intricate, with a least depth of 4 fathoms (7^{m}3) in it, and, as there are no natural leading marks, vessels are advised to mark the edges of the reefs before entering.

WESTERN COAST OF PEMBA (*continued*).—**Njao gap.—Port Kiuyu.—Anchorage.**—Njao gap, a channel between the mainland and the northern extreme of the island of Njao, about 20 miles northward of Ras Kingoji, *see* page 397, forms the entrance to the harbour of Port Kiuyu (*Lat. 4° 58′ S., Long. 39° 41′ E.*).

The edges of the reefs which form the sides of Njao gap, are steep-to and clearly defined, except at the outer entrance points, where shoal depths extend over one cable north-westward of the edge of the reef on the southern side of the gap; the reef on the northern side of the gap, is steeper.

No difficulty should be experienced in passing through Njao gap at low water, as the shoals are then plainly visible from aloft. The last of the out-going tidal stream sets towards the southern side of the gap.

The shores of the harbour of Port Kiuyu are much indented by shoal creeks, but the anchorage space, although not large, is clearer and more easy of access than is Port Kishi Kashi. The district around Port Kiuyu is not so thickly populated as those surrounding the harbours farther southward.

A good anchorage berth is in a depth of 12 fathoms (21^{m}9), about 7 cables south-eastward of the north-eastern extreme of Njao.

Chart 1812, plan of Msuka bay.

Coast.—Light.—From Njao gap, the coast trends northward for about 5½ miles to Ras Kigomasha, the north-western extreme of Pemba, and is broken only by occasional sandy bays; Tundu rock, 20 feet (6^{m}1) high, stands on the edge of the fringing reef, about one mile northward of Njao gap.

A light is exhibited, at an elevation of 125 feet (38^{m}1), from a grey, iron, framework tower, 90 feet (27^{m}4) in height, situated about half a mile within the extreme of Ras Kigomasha. The lighthouse is connected by telephone to the town of Wete.

NORTHERN COAST OF PEMBA.—Pemba knolls.—Between Ras Kigomasha and Ras Kiuyu, about 11 miles eastward, the northern coast of Pemba presents a uniform aspect of a low tree-covered country; Ras Kiuyu, the north-eastern extreme of Pemba, is a rocky, bush-covered promontory, with cliffs about 20 feet (6^{m}1) high, and the only point which may easily be identified, is Ras Kigomasha on which, in addition to the lighthouse, there was, in 1878, a distinctive clump of trees, 60 feet (18^{m}3) high.

The northern coast of Pemba is fronted by a 10-fathom (18^{m}3) bank, which extends nearly 9 miles offshore, on which there are numerous reefs, some of which dry, which are known as Pemba knolls; the easternmost of these reefs, which only just dries, always breaks heavily.

Kundeni knoll, the north-western of the reefs, lies about 4½ miles

Charts 1390, 664, 669, 597, 748b, 2483.

Chart 1812, plan of Msuka bay.

north-eastward of Ras Kigomasha, and dries 3 feet (0^{m}9); a bank, on which there is a least depth of 4 fathoms (7^{m}3), lies about 2 miles northward of Kundeni knoll (*Lat. 4° 49′ S., Long. 39° 44′ E.*).

Funguni knoll, about 4½ miles east-north-eastward of Ras Kigomasha, has on it a large sandbank, which dries 8 feet (2^{m}4); Punga-punge, which also dries, lies about 1½ miles north-eastward of Funguni knoll. Nyama, Gungoyu, and several other drying patches lie between Punga-punge and the coast.

The northern side of Ras Kiuyu is steep-to, and, during the south-west monsoon, anchorage may be obtained, in depths of 7 or 8 fathoms (12^{m}8 or 14^{m}6) about 5 cables north-westward of the point, but this anchorage is unsheltered north-eastward.

A bank on which the depths are less than 100 fathoms (182^{m}9), extends as much as 13 miles northward of the north coast of Pemba, and but little current is felt when on this bank.

Msuka bay.—Anchorage.—Directions.—The northern coast of Pemba is fringed by a drying reef, the outer edge of which extends as much as 2 miles north-north-eastward of Ras Kigomasha (*Lat. 4° 51′ S., Long. 39° 41′ E.*). A 3-fathom (5^{m}5) bank extends about 2 cables northward of the northern extreme of this reef, beyond which, discoloured water makes the reef appear more extensive than is the case; a sandbank, which dries 10 feet (3^{m}0), lies on the reef, about 6 cables northward of Ras Kigomasha.

About one mile eastward of Ras Kigomasha, there is a deep indentation in the fringing reef, which is known as Msuka bay, which affords good anchorage, even during the north-east monsoon, although, during the latter season, it is only partly sheltered from swell by the Pemba knolls.

Anchorage may be obtained, in a depth of about 6 fathoms (11^{m}0), with Ras Kigomasha bearing 300°, and Ras Kiuyu bearing 091°.

The best time to enter Msuka bay is at low water, when the reefs and shoals are visible. If approaching from south-westward, vessels should not alter course to round Ras Kigomasha until Ras Kiuyu bears 112°.

Sisini creek.—About midway between Msuka bay and Ras Kiuyu is the entrance to Sisini creek, a narrow inlet which affords good anchorage to dhows. The village of Sisini stands at the head of the creek, about 6½ miles south-south-westward of Ras Kiuyu, and there is good anchorage for boats off Paji, a village on the western side of the entrance where limited supplies of fresh provisions may be obtained.

Chart 1390.

EASTERN COAST OF PEMBA.—Current.—The eastern coast of Pemba is rather low, and caution is necessary when approaching it at night, but there are, apparently no dangers outside the fringing reef, which nowhere extends as much as one mile offshore. The depths increase rapidly off this coast, and, at 2 miles offshore, the depths are everywhere more than 100 fathoms (182^{m}9).

The current sets constantly northward along the east coast of Pemba, at rates of from one to 3 knots, although in December, its rate has been found to be as little as three-quarters of a knot. There is, at times, a fairly strong set into Adamson bay, about 9 miles southward of Ras Kiuyu.

Charts 640b, 664, 669, 597, 748b, 2483.

Chart 1390.

At some distance eastward and north-eastward of Pemba, the current sets about north by west.

Chart 1310, continuation of the East coast (inset).

Coast.—Between Ras Upembe, described on page 395, and Mtangani, a break in the fringing reef about 7 miles north-eastward, the coast consists of overhanging coral cliffs, about 15 feet ($4^{m}6$) high, thickly covered with trees, and is fronted by a drying reef, which extends between one and 4 cables offshore, on which the sea always breaks.

Mkiwani, an inlet about 4 miles north-eastward of Ras Upembe (*Lat. 5° 28′ S., Long. 39° 44′ E.*), has depths of 6 feet ($1^{m}8$) on its bar at high water, but the narrowest part of the channel, although deep, is only 14 feet ($4^{m}3$) wide.

For about three days on either side of the highest spring tides, there is a boat passage, available for small dhows, between Upembe harbour and Mkiwani creek; it leads northward of the island of which Ras Upembe forms the southern extreme, and thence along the coast within the fringing reef to Mkiwani creek. A boat passage, available at high water, leads through Mkiwani creek to Mtangani inlet, passing close to the village of Kiwani.

Mtangani.—Caution.—Mtangani, a narrow inlet, the entrance to which is a clearly defined break in the fringing reef, may be entered by small craft if navigated from aloft. The channel is three-quarters of a cable wide, and is smooth as soon as the outer line of breakers is passed. About half a mile within the outer edge of the fringing reef, the channel makes a sharp turn south-westward, and anchorage may be obtained close southward of the bend. In 1889, H.M.S. *Stork* moored here and experienced little or no tidal stream.

Caution is necessary in entering or leaving Mtangani, as the current sets strongly northward along the edge of the fringing reef, and, as soon as the outer edge of the reef is passed, the current is lost, and the tidal stream, running directly in or out, is felt. So clearly marked is the dividing line, that the bows of a vessel may be in the tidal stream, while her stern is in the current, or *vice versa.*

Chart 1390.

Coast.—Mchengangazi.—Between Mtangani and Mchengangazi, an inlet about 17 miles north-north-eastward, the coast consists of low overhanging coral cliffs, with numerous small creeks and a few sandy beaches. Trees and bushes cover the cliffs to within a few feet of their edges.

The fringing reef is narrow, steep-to and without any off-lying dangers, and the sea generally breaks on it; close to its edge, the north-going current runs strongly.

Chart 1310 plan of Mchengangazi.

Mchengangazi is an inlet with an entrance channel about one cable wide, which leads through the coastal reef to a large basin; the basin dries, except for a few narrow creeks. At the head of the inlet, about 2 miles within the entrance, a narrow passage, available for boats, leads northward past the village of Kojani (Kodian) into Adamson bay.

In 1889, H.M.S. *Stork* moored about 1½ miles within the southern entrance point, in a depth of 7 fathoms ($12^{m}8$), and no appreciable tidal stream was experienced at this anchorage.

The tidal stream sets directly in and out through the entrance, and, *Chart 1310, plan of Mchengangazi.*

as at Mtangani, caution is necessary when passing from the tidal stream to the current or *vice versa.*

Chart 1390.

The entrance to Adamson bay lies between 4 and 5 miles northward of Mchengangazi, but the sea breaks right across the entrance and some distance into the bay, and there is no access to it from seaward. In 1892, a square clump of casuarina trees, very conspicuous from being the only clump of these trees in the vicinity, stood on the northern entrance point, and there is a small coral islet, close northward of the southern entrance point. A small, black islet, 54 feet ($16^{m}5$) high, lies on the reef close eastward of the conspicuous clump of trees, but, being under the land, it is not easily distinguished.

Between the northern entrance point to Adamson bay and Ras Kiuyu (*Lat. 4° 54′ S., Long. 39° 52′ E.*), described on page 407, about 8 miles northward, the coast consists of cliffs from 15 to 20 feet ($4^{m}6$ to $6^{m}1$) high, with a few sandy beaches, and is covered with trees and scrub.

The coastal reef extends from a quarter of a mile to one mile offshore, with no off-lying dangers, and, except close to Ras Kiuyu, it is steep-to and generally breaks.

For about 1½ miles south-eastward of Ras Kiuyu, however, rocky ground, with coral heads, with depths of from 2 to 3 fathoms ($3^{m}7$ to $5^{m}5$) over them, extends nearly one mile offshore; these coral heads do not break, and it is inadvisable to approach this part of the coast within 1½ miles.

Haycock islet, 42 feet ($12^{m}8$) high, is a small bare islet, lying about 2 cables offshore, about 5½ miles northward of the northern entrance point to Adamson bay; it does not show up well, being close under the land.

About one mile northward of Haycock islet, there was, in 1892, a conspicuous, rounded clump of trees which stood close within the coast, above a strip of white sand, which, for a distance of about one mile, fringes a slightly projecting point.

Charts 663 and 1390.

WESTERN SIDE OF PEMBA CHANNEL.—Pangani bay to Ras Nyamaku.—Aspect.—Between Pangani bay, described on page 369, and Ras Nyamaku, about 20 miles north-north-eastward, the country is low, well-wooded and apparently fertile. The coast is sandy, with occasional small coral cliffs, and, at the northern part, there are two large bays. There are numerous villages scattered along the coast, which are rendered distinctive by groves of tall coconut palms which surround them, and the whole of this stretch of coast is fronted by a chain of large reefs, lying between 3 and 4 miles offshore.

Coast. — Danger. — Beacon. — A mangrove swamp commences about 2 miles northward of the steep slope which borders Pangani bay, and continues for about 3 miles north-north-eastward to the village of Dakali. Between Dakali and Ras Mtangata, about 7½ miles north-north-eastward, the coast is sandy and is backed by coconut groves close within it. The principal villages are Kigombe and Kingani, about 4½ and 2 miles, respectively, southward of Ras Mtangata; in the former village, there are four white houses with red roofs.

Chart 663.

Between Ras Mtangata and Ras Kisangani, about 3½ miles north-

Chart 663.

north-eastward, is Mtangata bay, in which the depths are shoal; Mtangata creek, at the head of the bay, nearly dries. On the southern shore of the bay, there are numerous villages among coconut palms, of which Moarongo and Tamborani are the most important; the north-western shore of the bay is a mangrove swamp, but Ras Kisangani (*Lat. 5° 11′ S., Long. 39° 07′ E.*) is higher than the adjacent coast and makes a good landmark.

Between Pangani bay and Ras Mtangata, the coast is fringed by a drying reef, which, abreast Ras Mtangata, extends over 1½ miles offshore, and is known as Mtangata reef.

A beacon, painted red and surmounted by a cage, stands on the north-eastern extreme of Mtangata reef, nearly 1¾ miles east-north-eastward of Ras Mtangata.

Between Ras Kisangani and Ras Nyamaku, about 3½ miles north-north-eastward, is Mwambani bay, which is free from dangers and has depths of from 6 to 8 fathoms ($11^{m}0$ to $14^{m}6$) which decrease gradually towards its shores; the latter are fringed by a reef which extends between 2 and 4 cables offshore.

Chart 1390.

Off-lying islands and dangers.—South Head reef and the dangers southward of it, are described on page 370.

Fungu Tongone is a reef, the northern part of which dries, lying about 3½ miles south-eastward of Ras Mtangata. A sandy islet, 19 feet ($5^{m}8$) high, stands on the inner edge of the northern part of Fungu Tongone. A 3½-fathom ($6^{m}4$) ridge connects Fungu Tongone to South Head reef and a shoal spit, with a drying patch, extends 1½ miles southward of the southern end of Fungu Tongone reef.

Kitanga, a drying reef, lies about 4 miles southward of Ras Mtangata, and about half a mile westward of the southern part of Fungu Tongone. Tengale, a similar reef, lies about 5¼ miles southward of Ras Mtangata, and there is a rock, with a depth of less than 8 feet ($2^{m}4$) over it, situated about midway between Kitanga and Tengale, while a narrow reef with an islet at its southern end lies close offshore, abreast the village of Dakali. The north-eastern end of this reef lies about 7 cables south-south-westward of Tengale. Kitanga, Tengale and the reef abreast Dakali, are all on the western side of the channel between the outer reefs and the coast.

Chart 663.

Karange islands are a chain of narrow islands covered with scrub, of which the southernmost lies about 2½ miles eastward of Ras Mtangata. They stand on an extensive drying reef, the southern extreme of which is separated by a narrow channel from the spit extending northward of Fungu Tongone. The reef is steep-to, especially on its eastern side.

There is a channel, about 6 cables wide, between the northern extreme of the reef surrounding Karange islands, and a reef northward of it, which surrounds the island of Yambe. A 2-fathom ($3^{m}7$) shoal lies in the centre of the inner part of this channel, and there are depths of 6 and 7 fathoms ($11^{m}0$ and $12^{m}8$) in the channel southward of the shoal, and of more than 10 fathoms ($18^{m}3$), northward of it.

The island and reef of Yambe (*Lat. 5° 07′ S., Long. 39° 10′ E.*), and the dangers northward of it, are described on page 413.

Charts 663 and 1390.

Inner channel.—The passage from Pangani bay to Mwambani bay can be made without difficulty, using the channel between the outer reefs and the mainland. The passage should be made at low water with the sun in a favourable position, when the reefs can easily be distinguished. The inner channel is smooth, even when the monsoon is strong, at which time it is much used by dhows.

Chart 663.

TANGA BAY AND APPROACHES.—**Aspect.**—Tanga bay is entered between Ras Kasone, a cliffy point covered with vegetation, about 4 miles north-north-westward of Ras Nyamaku, and Ras Chongoliani, a mangrove-covered point, about 1½ miles northward. The head of the bay is filled by a 3-fathom (5^{m}5) bank, the inner part of which dries, but vessels of light or moderate draught may obtain sheltered anchorage, in depths of from 3¼ to 6 fathoms (5^{m}9 to 11^{m}0) in Tanga inner harbour at the southern part of the bay, westward of Ras Kasone, and there is a large area between Ras Kasone and Ras Chongoliani in which anchorage, in depths of from 6 to 10 fathoms (11^{m}0 to 18^{m}3) may be obtained by all classes of vessels.

Chart 664.

The coast in the vicinity of Tanga bay is low, but in clear weather, the Bondei mountains, which cover a large tract of country about 23 miles inland, are conspicuous. Mlinga (Mbringa), a mountain with three peaks, the centre and highest of which is about 3,540 feet (1,079^{m}0) in height, stands nearly 24 miles westward of Ras Kasone and is the most conspicuous of these mountains; Mhinduro (Rukindo) a double-peaked mountain 3,425 feet (1,043^{m}9) in height, about 8 miles northward of Mlinga, is also conspicuous in certain lights. Westward of these mountains, distant peaks rise to an elevation of nearly 10,000 feet (3,048^{m}0), but although these may sometimes be seen during the north-east monsoon, haze frequently obscures all but the easternmost peaks during the south-west monsoon.

Chart 1390.

Kilulu, 877 feet (267^{m}3) high, the northernmost of three rounded hills, stands about 17 miles northward of Ras Kasone and about 6 miles inland, and is nearly always visible to vessels approaching from northward. About 20 miles farther northward are two isolated, conical mountains, Jombo, the more distant, being 1,543 feet (470^{m}3) high, and Mrima, a truncated peak, 1,052 feet (320^{m}6) high; in clear weather, both these mountains are visible from Pemba.

Chart 663.

On a closer approach, Tanga bay may be identified by the Amboni hills, 495 feet (150^{m}9) high, which rise from low and flat land, about 5 miles north-westward of Ras Kasone. This range is densely wooded, rounded and presents no clearly defined summits, but there is a well marked saddle between the two southernmost and highest eminences. A patch of red cliff, about half a mile southward of Ras Kasone (*Lat. 5° 04′ S., Long. 39° 08′ E.*), shows very distinctly when the sun is eastward.

The numerous islands off this part of the coast are low and densely wooded, and in clear weather, they are generally difficult to distinguish from the mainland, but with any haze over the land, they stand out more clearly. The islands northward of Tanga bay are so close to the

Chart 663.

coast as to be difficult to distinguish until near the off-lying reefs, but Karange islands and Yambe, about 4 miles southward, and one mile eastward, respectively, of Ras Nyamaku, may be identified.

Off-lying island and reefs.—Beacons.—The coast in the vicinity of Tanga bay, is fronted by an almost continuous line of outer reefs, which extends nearly parallel with the coast, about 3 miles offshore, with occasional navigable passages between the reefs. The latter, with few exceptions, have large parts which dry, and break at all times. They are not all steep-to, and should be given a good berth.

Yambe, an island standing on a reef of the same name, is situated about 2½ miles northward of the northernmost of the Karange islands, described on page 411, and about one mile eastward of Ras Nyamaku and is covered with dense jungle. The surrounding reef dries from one to 6 feet ($0^{m}3$ to $1^{m}8$), and on the reef, off the northern extreme of the island, are some rocky islets. The highest is 15 feet ($4^{m}6$) in height and forms a useful mark.

Niule, a coral reef, which dries one to 3 feet ($0^{m}3$ to $0^{m}9$) in patches, lies about one mile north-eastward of Yambe. Its north-western and south-eastern edges are moderately steep-to, but depths of less than 5 fathoms ($9^{m}1$) extend for about 5 cables eastward of its eastern extreme.

Three white beacons, on tripods, stand on Niule, two are situated near its north-western edge, and one near its north-eastern edge ; the highest beacon is 40 feet ($12^{m}2$) in height.

Fungu Nyama (*Lat. 5° 02′ S., Long. 39° 14′ E.*) is a coral reef, which dries in patches, situated about 4 miles north-eastward of the northern extreme of Yambe, and about 1½ miles north-eastward of Niule ; a large sandbank near its centre, dries about 10 feet ($3^{m}0$).

Several shoals, with depths of from 1½ to 3 fathoms ($2^{m}7$ to $5^{m}5$) over them, lie off the southern and eastern sides of Fungu Nyama, and extend from 1¼ miles southward to about half a mile eastward, of the edge of the reef.

Two white beacons, on tripods, stand near the centre of Fungu Nyama ; the higher beacon is 40 feet ($12^{m}2$) in height.

The beacons on Niule and Fungu Nyama are not very noticeable but serve to mark the reefs when the coast of the mainland is hidden by mist.

Mwamba Wamba, a reef situated about 8½ miles north-eastward of the northern extreme of Yambe, and about 2 miles north-north-eastward of Fungu Nyama, is described on page 419.

Channels.—Buoyage.—Ship channel, the main entrance to Tanga bay, lies between Niule and Fungu Nyama. It has depths of over 10 fathoms ($18^{m}3$) in a channel about 8 cables wide.

A can buoy painted in red and white chequers is moored off the northern extreme of Niule about 4½ miles eastward of Ras Kasone and marks the south-western side of Ship channel.

A black conical light-buoy, exhibiting a *white flashing* light *every four seconds*, is moored off the southern end of the shoals extending southward from Fungu Nyama, about 6 miles eastward of Ras Kasone (*Lat. 5° 04′ S., Long. 39° 08′ E.*), and marks the north-eastern side of Ship channel.

The depths in the channel between Yambe and the coast northward of Ras Nyamaku, are shoal, and the channel is encumbered with rocks,

Charts 1390, 664, 669, 597, 748b, 2483.

Chart 663.

but there is a least depth of 1¼ fathoms (2^m3) in a narrow channel which passes close to the north-western coast of Yambe.

Southern channel lies between the reefs of Yambe and Niule, and may be used by small craft from southward whose draught will permit them to cross a ridge which connects the southern end of Niule with the eastern side of the reef surrounding Yambe; there is a least depth of 4¼ fathoms (7^m8) in a narrow channel across the centre of the ridge. This channel is not marked.

The channel between Fungu Nyama and Mwamba Wamba is barred by a ridge, on which there are several rocky patches with depths of 4 fathoms (7^m3), and possibly less depths over them. The greatest depths are found near Fungu Nyama, but the channel has not been closely examined, and other shoals may exist. Two 5-fathom (9^m1) patches lie about one mile northward of Fungu Nyama. This channel is not marked.

Pilotage.—Pilotage is compulsory for merchant vessels, which must not proceed westward and southward of a line joining the following places:—

(i) The southern extremity of Ulenge island (*Lat. 5° 01′ S., Long. 39° 10′ E.*).

(ii) A position in Lat. 5° 03′ S., Long. 39° 11′ E.

(iii) The northern extremity of Rocky islet (*Lat. 5° 05′ S., Long. 39° 10′ E.*).

(iv) A line drawn from (iii) above in a 270° direction to the shore.

In cases where a pilot is not available to meet an incoming ship, in the vicinity of the above limits, vessels may pass westward of the limits for the sole purpose of anchoring in safety and awaiting a pilot but, in these circumstances, vessels must on no account anchor northward of the alignment of the Ras Kasone leading light-structures (*see* below).

Dangers in approach to Tanga bay.—Buoyage.—Caution.— Dixon bank, a small coral patch with a least depth of 3 fathoms (5^m5), lies on the southern side of the approach to Tanga bay and in the fairway of the northern entrance to Southern channel, about 2 miles eastward of Ras Kasone.

A depth of 7½ fathoms (13^m7) exists about 5 cables north-north-eastward of Dixon bank on the alignment of the inner pair of leading lights.

Depths of 5 fathoms (9^m1) exist in the fairway about one mile eastward of Ras Kasone front leading light-beacon and close northward of the leading line.

Between Ras Chongoliani and Ras Kwawa, a similar mangrove-covered point, about 2 miles north-eastward, the coast is fronted by an extensive reef, most of which dries, which extends as much as 2 miles offshore. On the north-eastern part of this reef, about half a mile eastward of Ras Kwawa, stands Ulenge, an island which presents a featureless line of rocky points and mangroves.

Ulenge reef, a detached reef which barely dries, lies about 1¼ miles southward of the island of Ulenge; depths of less than 5 fathoms (9^m1) extend up to 3 cables southward and south-westward of Ulenge reef.

A small detached reef lies about one mile east-south-eastward of Ras Chongoliani.

Charts 1390, 664, 669, 597, 748b, 2483.

Chart 663.

A black conical light-buoy, exhibiting a *green flashing* light *every six seconds,* is moored about 2½ miles east-south-eastward of Ras Chongoliani and marks a 2¾-fathom ($5^{m}0$) detached shoal patch near the southern end of Ulenge reef.

Charts 663, 866, plan of Tanga inner harbour.

Kwawa reef consists of two patches of reef, awash, situated about 5 and 7 cables, respectively, southward of Ras Chongoliani.

A black conical buoy is moored about 8 cables southward of Ras Chongoliani, and marks the southern end of Kwawa reef. No reliance can be placed on the buoys being in their charted positions.

Ras Kasone and the point eastward of it are fringed by a reef which extends from one to 2 cables offshore. A rock awash lies on the edge of the 3-fathom ($5^{m}5$) line about 2½ cables north-westward of Ras Kasone, and depths of 6 fathoms ($11^{m}0$) and less extend north-westward for nearly another cable. For details of the light which stands seaward of the rock awash, *see* page 416.

Chart 663.

Lights.—Signal station.—Leading lights are established for Ship channel. The rear light is exhibited, at an elevation of 85 feet ($25^{m}9$), from a white rectangular tower with a black band, 85 feet ($25^{m}9$) in height, situated on the north-eastern extreme of the island of Ulenge. The front light is exhibited, at an elevation of 38 feet ($11^{m}6$), from a white framework structure, 48 feet ($14^{m}6$) in height, situated on the reef, about 1½ cables south-eastward of the rear light. These lights in line, bearing 319°, lead through Ship channel between Niule and Fungu Nyama.

Charts 663, 866, plan of Tanga inner harbour.

Leading lights are established at Ras Kasone (*Lat. 5° 03′ S., Long. 39° 07′ E.*). The rear light is exhibited, at an elevation of 96 feet ($29^{m}3$), from a white, framework, steel tower, 59 feet ($18^{m}0$) in height, situated near the north-western extreme of Ras Kasone. The front light is exhibited, at an elevation of 28 feet ($8^{m}5$), from a white, framework structure, 38 feet ($11^{m}6$) in height, situated on the reef about 3 cables eastward of the rear light. These lights in line, bearing 266°, lead towards the entrance to Tanga bay between Dixon bank and Ulenge reef.

There is a signal station on Ras Kasone rear light-structure, which carries a yard, braced northward and southward, slung at an elevation of 95 feet ($29^{m}0$). There is a conspicuous house about 1¼ cables south-eastward of Ras Kasone rear light-structure (*Lat. 5° 03′ S., Long. 39° 07′ E.*).

Northern and western shores of Tanga bay.—The northern and western shores of Tanga bay are bordered with mangroves and the head of the bay is a mangrove swamp which is fronted by a 3-fathom ($5^{m}5$) bank which extends about 8 cables offshore. Mto Zigi, known at its mouth as Mto Mgambo, flows into the north-western corner of the bay, about 2 miles westward of Ras Chongoliani; there are depths of 3 feet ($0^{m}9$) at its entrance, and it is navigable for a few miles, after which it becomes obstructed by rapids.

Chart 866, plan of Tanga inner harbour.

Tanga inner harbour.—Dangers.—Beacons.—Tanga inner harbour is entered between Ras Kasone and Tanga island, about 6 cables westward. From Ras Kasone, the southern shore of Tanga bay trends

Charts 866, plan of Tanga inner harbour.

south-westward for about one mile to the town of Tanga, which lies on the southern shore, on a plateau, about 50 feet (15^m2) high. Between Ras Kasone and the eastern side of the town, about one mile south-westward, the southern shore of the harbour is fringed by a reef which extends as much as 1½ cables offshore in places. A groyne, the seaward end of which is submerged, extends about one cable from the shore from a position about half a cable west-south-westward of Ras Kasone rear light-structure ; two beacons stand about midway between the light-structure and the groyne.

A conspicuous hospital is situated north-eastward of the town, nearly 8 cables south-westward of Ras Kasone rear light-structure ; other prominent buildings include the police station and church, in the western part of the town.

Tanga island lies about 5 cables northward of the southern shore of the harbour, its eastern extreme being about 6 cables westward of Ras Kasone. The eastern part of the island has bare, red cliffs, about 30 feet (9^m1) high in places, but the western part is low and is fringed with mangroves, which extend also off the northern and eastern points of the island. A pier, about 200 feet (61^m0) in length, behind which there is a storehouse, projects from the south-western extremity of Tanga island. There are two white beacons, each surmounted by a triangle, on the north-eastern end of the island ; in line they bear 234°.

A bank of coral and mud, the inner part of which dries, surrounds Tanga island and extends nearly 2 cables eastward of its eastern extreme.

A detached shoal, with a depth of 21 feet (6^m4) over it, lies about 2½ cables eastward of the eastern extremity of Tanga island.

Lights. — Beacons. — Light-buoy. — The fairway, from the entrance to Tanga bay to the anchorage in the inner harbour, is marked as follows :—

A light is exhibited, at an elevation of 35 feet (10^m7), from a red iron framework beacon, marking the edge of the shoal fringing Ras Kasone, about 2½ cables north-north-westward of Ras Kasone rear light-structure (*Lat. 5° 04′ S., Long. 39° 08′ E.*).

A light is exhibited, at an elevation of 35 feet (10^m7), from a black iron framework beacon, marking the edge of the shoal bank extending eastward of Tanga island, about 4½ cables eastward of Ras Kasone rear light-structure.

Two beacons stand on the southern side of Tanga bay, about 5½ cables south-south-westward of Ras Kasone ; in line they bear 183°.

A light is exhibited, at an elevation of 13 feet (4^m0), from a white concrete beacon on the northern extremity of Hospital spit, about 2¼ cables north-north-eastward of the hospital.

Leading beacons are established eastward of the hospital. The front beacon is a pillar, surmounted by a white triangle, 25 feet (7^m6) in height, painted in black and white horizontal bands, and situated on the shore about 7 cables south-westward of Ras Kasone rear light-structure. The rear beacon is a pillar, 20 feet (6^m1) in height, painted in black and white horizontal bands and surmounted by a white ball, situated about one cable south-south-westward of the front beacon. These beacons in line, bearing 199°, lead between the shoal fringing Ras Kasone and that extending eastward of Tanga island.

Charts 663, 1390, 664, 597, 748b, 2483.

Chart 866, plan of Tanga inner harbour.

A beacon stands in shoal water, on the southern side of the bay, about half a cable eastward of the passenger pier light-structure (page 418). This beacon, in line bearing 223° with a leading mark on the railway wharf, distant about one cable, leads through the central part of the harbour close eastward of the detached 21-foot (6^m4) shoal which lies 2½ cables eastward of the eastern extremity of Tanga island.

Leading beacons are established north-westward of the town. The rear beacon is a white framework structure, surmounted by a square, 30 feet (9^m1) in height, situated on the shore about 8½ cables westward of the hospital, and the front beacon is a similar beacon, about 2½ cables east-north-eastward of the rear beacon. These beacons in line, bearing 247°, lead between the shoals fringing the southern side of Tanga island and the southern shore of the inner harbour.

A white conical light-buoy, exhibiting a *white fixed* light, moored on the southern side of the harbour, marks the edge of the 3-fathom (5^m5) line about 2½ cables west-north-westward of the hospital.

Traffic regulations.—Traffic signals.—No vessel of 200 tons and upwards, may enter, leave or shift berth within Tanga inner harbour, without a representative of the Port Authority aboard.

The following regulations are in force for vessels approaching or leaving Tanga bay :—

1. (*a*) No power vessel shall enter, leave or get under way within the limits of the inner harbour of the port of Tanga, unless the signal station at Ras Kasone indicates that the channel is clear for her to do so, as prescribed in the schedule of signals described hereafter.
   (*b*) For the purpose of these rules, the inner harbour shall include all waters within the port of Tanga, southward of an imaginary line drawn 290° from the signal station on Ras Kasone (*Lat. 5° 03′ S., Long. 39° 07′ E.*).
2. Subject to the discretion of the Port Officer, out-going power vessels shall have a right of way over in-going power vessels.
3. Power vessels wishing to leave harbour, shall, after shortening in cable, sound *one long* blast on their sirens, and shall not get under way until a black flag by day or 3 *red* lights, disposed vertically, by night, are displayed at the signal station.
4. Power vessels entering harbour shall not enter the inner harbour until a black ball by day or 3 lights, *white, red, white,* disposed vertically, by night, are displayed at the signal station.
5. When more than one power vessel wishes to leave harbour at the same time, the vessel which is berthed eastward of the other shall get under way first.
6. When more than one power vessel wishes to enter harbour, the vessel which has arrived off the inner harbour first shall take priority.
7. Harbour craft, small sailing craft, native craft and rowing boats shall keep clear of power vessels over 300 tons gross, under way within the limits of Tanga inner harbour.

The following is a schedule of traffic signals, displayed at the signal station on Ras Kasone :—

Chart 866, plan of Tanga inner harbour.

Entry prohibited	A black flag by day. Three *red* lights disposed vertically, by night.
Departure prohibited	A black ball by day. Three lights, *white*, *red*, *white*, disposed vertically, by night.

For details of compulsory pilotage limits, *see* page 414.

Charts 663 and 866, plan of Tanga inner harbour.

Anchorage.—Directions.—If awaiting a pilot (*see* page 414) good anchorage may be obtained, either by day or night, in the area westward of an imaginary line drawn from Ulenge reef to Dixon bank and southward of the line of Ras Kasone leading light-beacons.

Vessels should, if possible, make the port in the morning, as in the afternoon the sun causes inconvenience, and the leading light-structures are not distinctive. The water in the vicinity of Niule, Fungu Nyama and other outer reefs, is generally clear, but within Ulenge reef, it is discoloured and the shoals are not easily distinguished.

Vessels from northward should keep well clear of the outer reefs until the light-structures on the island of Ulenge are in line, bearing 319°, when they should be steered for on that bearing until the light-structures at Ras Kasone (*Lat.* 5° 03′ *S.*, *Long.* 39° 07′ *E.*) are in line, bearing 266°, when the latter should be steered for on that bearing, having regard to the 7½- and 5-fathom ($13^{m}7$ and $9^{m}1$) depths mentioned on page 414. When about one mile eastward of Ras Kasone, course should be altered north-westward and shaped to round Ras Kasone at a distance of about 4 cables, until the leading beacons on the north-eastern extremity of Tanga island come into line bearing 234°, when course should be altered to 234°. When the leading beacons eastward of the hospital are in line, bearing 199°, they should be steered for on that bearing, and anchorage obtained as convenient. Leading marks for proceeding further up harbour are described on pages 416 and 417.

Vessels from southward should keep well outside the outer reefs until the light-structures on the island of Ulenge are in line, bearing 319°, when the directions given above, should be followed.

Chart 866, plan of Tanga inner harbour.

Wharf.—Light.—A wharf for lighters extends about 600 feet ($182^{m}9$) south-westward, from a point about 3 cables westward of the hospital, and, at its eastern end, is a wooden passenger pier which has a depth of 10 feet ($3^{m}0$) alongside.

A light is exhibited at an elevation of 13 feet ($4^{m}0$) from the head of the passenger pier.

Port facilities.—Supplies.—The wharf is served by the railway, and has several cranes, of which the largest has a lifting capacity of 15 tons.

There are three tugs and several lighters at the port.

A small quantity of coal is stocked for local use. Vessels do not normally bunker at Tanga.

A small quantity of diesel oil, in drums, is maintained.

Limited quantities of fresh provisions are obtainable if sufficient notice is given.

Town.—The town of Tanga is the administrative centre of the district of that name, and is the principal town in the northern part of Tanganyika Territory. A Provincial Commissioner is resident.

Charts 1390, 664, 669, 597, 748b, 2483.

Chart 866, plan of Tanga inner harbour.

The town stands on a plateau above the harbour, and is partly hidden by mango trees and coconut palm groves.

There is a Government hospital with accommodation for Europeans.

In 1948, the population was 34,658, of whom 383 were Europeans.

During the year 1948, a total of 68,401 tons of cargo was landed and 139,568 tons of cargo cleared at Tanga.

The principal industry is the manufacture of soap.

Communications.—There is regular communication by sea with Europe, South Africa and other East African ports.

Tanga is the terminus of the Usambara railway, which is connected to the Kenya and Uganda railway system.

Tanga is connected to the general telegraphic system.

There is a regular air service with other East African ports, and with Europe and South Africa via Mombasa.

Climatic table.—*See* page 78.

Charts 663 and 1390.

WESTERN SIDE OF PEMBA CHANNEL (continued).—**Off-lying reefs and dangers.—Beacon.**—Between Ras Kwawa, described on page 414, and Ras Kilifi, about 13 miles north-north-eastward, the coast continues to be fronted by a chain of reefs which gradually increases its distance offshore, Mwamba Kitugamue, the northern reef of the chain, being about 8½ miles eastward of Ras Kilifi (*Lat. 4° 48′ S., Long. 39° 13′ E.*).

Fungu Nyama and the passage between it and Mwamba Wamba, are described on pages 413 and 414.

Mwamba Wamba, a reef lying about 5 miles east-north-eastward of Ulenge rear light-tower, has on its northern part a sandbank which dries 8 feet ($2^{m}4$). Its eastern side is moderately steep-to, but a patch of reef, with less than 6 feet ($1^{m}8$) over it, lies about 7 cables off its western side, and patches, with 2¼ and 5¼ fathoms ($4^{m}3$ and $9^{m}6$) over them, lie about 6 and 11 cables, respectively, north-westward of its south-western extreme.

A white tripod beacon, surmounted by a white staff and cage, stands near the south-western extremity of the reef.

Chart 1390.

Mwamba Shundo lies about half a mile north-north-eastward of Mwamba Wamba, and about 8½ miles north-eastward of Ulenge rear light tower; it is moderately steep-to, and its northern part dries about 4 feet ($1^{m}2$).

A shoal, with a depth of one foot ($0^{m}3$) over it, lies in the channel between Mwamba Shundo and Mwamba Wamba. This shoal is believed to be extensive, but has not been surveyed, and the channel has not been closely examined.

Foul ground, with patches of from 1¼ to 2¾ fathoms ($2^{m}3$ to $5^{m}0$) in places, covers an area about one mile in extent, about half a mile northward of Mwamba Shundo, and about 7 miles south-eastward of Ras Kilifi.

Mwamba Kitugamue lies about 6 miles north-eastward of Mwamba Shundo; the reef dries and is steep-to on its eastern side. A bank, with depths of from 2¾ to 10 fathoms ($5^{m}0$ to $18^{m}3$), extends about 2½ miles southward of Mwamba Kitugamue, and there is a 3¼-fathom ($5^{m}9$) patch, off its north-western end.

Charts 664, 669, 597, 748b, 2483.

Chart 663.

Coast.—Off-lying danger.—Kwale bay is entered between the northern extreme of the island of Ulenge and the southern extreme of the island of Kwale, about 8 cables northward. The island of Kwale or Mnasini, which forms the north-eastern side of the bay, consists mostly of mangrove swamps and is uninhabited. Its eastern side is steep-to, except for a spit with less than 6 fathoms ($11^{m}0$), extending about 3½ cables east-north-eastward from the north-eastern end of the island. The other sides are fronted by shoals, which extend a considerable distance offshore.

The shores of the bay are fringed with mangroves and fronted by a 3-fathom ($5^{m}5$) bank which extends as much as one mile offshore, but there are depths of 15 fathoms ($27^{m}4$) in the entrance, and well-sheltered anchorage may be obtained in the centre of the bay, in depths of from 5 to 12 fathoms ($9^{m}1$ to $21^{m}9$). There are several villages on the shores of the bay, the village of Kwale being at its northern corner, opposite the eastern extreme of the island of Kwale. A boat channel connects Kwale bay to Manza bay, passing within the island of Kwale (*Lat. 4° 59′ S., Long. 39° 10′ E.*).

Mto Msembasi (Msimbazi), the only fresh water river in the vicinity flows into the western corner of the bay.

A 5-fathom ($9^{m}1$) patch, lies off the entrance to Kwale bay, about 8 cables east-north-eastward of Ulenge rear light-tower.

Manza bay.—Dangers in approach.—Foul ground.—Manza bay is entered between Ras Mnasini, the northern extreme of the island of Kwale, about 3 miles northward of Ulenge rear light-tower, and Ras Mavemavili, the southern extreme of Boma peninsula, about one mile northward. Bee islet lies on the edge of the reef, which dries, about 2½ cables east-north-eastward of Ras Mnasini. Two small rocks lie on the edge of the reef, about 1½ cables southward of Ras Mavemavili. There are depths of from 3¼ to 14 fathoms ($5^{m}9$ to $25^{m}6$) in the channel between the reefs which fringe both entrance points, and within the bay, there are depths of from 5 to 11 fathoms ($9^{m}1$ to $20^{m}1$) over a considerable area.

On the northern side of the entrance, a bank with depths of under 6 fathoms ($11^{m}0$) over it, extends about half a mile southward and west-south-westward of Ras Mavemavili. Rocks with less than 6 feet ($1^{m}8$) over them, lie about 1½, 5½ and 7 cables, respectively, westward of Bee islet, and a rock awash lies close inshore, about one mile west-south-westward of this islet. Shoals, with depths of 6 fathoms ($11^{m}0$), 5 fathoms ($9^{m}1$) and 3 fathoms ($5^{m}5$) lie about 8 cables, 1¼ miles, and 1¾ miles, respectively, westward of Ras Mavemavili. Shoals, with depths of 5¾ fathoms ($10^{m}5$) and 6 fathoms ($11^{m}0$), lie about 5¾ and 7 cables, respectively, southward of Ras Kitamba, which is situated about 1¾ miles north-westward of Ras Mavemavili. A rock, with less than 6 feet ($1^{m}8$) over it, lies about 1¼ miles south-westward, and a shoal, with a depth of 2½ fathoms ($4^{m}6$), about 6 cables westward of Ras Kitamba.

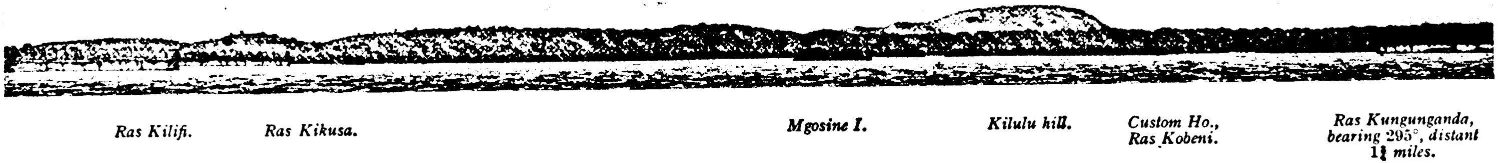
Foul ground, indicated on the chart by pecked lines, extends about 7 cables south-westward from the edge of the reef between 1½ and 3 cables north-westward of Ras Mavemavili.

A 3-fathom ($5^{m}5$) bank extends from 5 to 7 cables off the southern and western shores, and about 3 cables off its eastern shore.

The western shore of the bay is low, with coconut palms in places,

Charts 1390, 664, 669, 597, 748b, 2483.

To face page 421.


Ras Kilifi.
Ras Kikusa.
Mgosine I.
Kilulu hill.
Custom Ho., Ras Kobeni.
Ras Kungunganda, bearing 295°, distant 1¾ miles.

Moa or Gomani Bay from eastward.

(*Original dated* 1915.)

Chart 663.

and, within about 2 miles northward of the village of Kwale (*Lat. 4° 58′ S., Long. 39° 09′ E.*) at the south-eastern corner of the bay, contains the villages of Dodo, Werro, Monga, Pampani and Kitshalikani. The latter village lies at the southern entrance to Pani Mkumbi, a mangrove-bordered creek, in which the depths are shoal.

Chart 1390.

The northern part of the bay opens into Mto Manza, an extensive creek, the eastern side of which is formed by Boma peninsula. The moderately populous village of Manza stands at the head of the creek, about 7 miles northward of Ras Mavemavili, and can be reached by dhows at high water.

Chart 663.

Kwale bank, consisting of several detached patches, with depths of from less than 6 feet to 4¾ fathoms ($1^{m}8$ to $8^{m}7$) over them, is situated near the fairway of the approach to Manza bay, about 2 miles eastward of Ras Mnasini.

The ruins of a signal station stand on Ras Mavemavili.

Small supplies of fresh provisions may be obtained from the villages in Manza bay, but the water obtained from wells is bad, and, as stated above, the only fresh water river in the vicinity is Mto Msembasi in Kwale bay.

Directions.—Vessels from southward are recommended to approach Manza bay through Ship channel, described on page 413, and to keep Ulenge light-structures in line, bearing 319°, until within about 1½ miles of the rear light-structure, when course may be shaped northward to pass about one mile off the eastern coasts of the islands of Ulenge and Kwale, taking care to avoid the 5-fathom ($9^{m}1$) patch off the entrance to Kwale bay. When abreast the entrance to Manza bay, the village of Monga is easily seen and, bearing 275°, leads through the entrance passing 5 cables southward of Ras Mavemavili.

Charts 663 and 1390.

Vessels from northward should approach Manza bay within the chain of outer reefs, passing northward of Mwamba Kitugamue, with Kilulu, described on page 412, in line with Ras Kungunganda, described below, bearing 272°. When well westward of Mwamba Kitugamue, course may be shaped south-westward to pass about 2 miles off the eastern coast of Boma peninsula until abreast Boma reef, described below, when course may be shaped for the entrance.

Coast.—Dangers.—Between Ras Mavemavili and Ras Kilifi, about 9 miles north-north-eastward, except at Boma reef and abreast Mkadini bay, the coast is steep-to, with no dangers over half a mile offshore.

Boma reef, which dries, lies about 7 cables offshore, about 3 miles northward of Ras Mavemavili ; there are depths of 3¾ fathoms ($6^{m}9$) in the narrow channel which separates Boma reef and the coast. A narrow ridge, less than one cable wide, with depths of 4¾ fathoms ($8^{m}7$), extends from the coast about 2 miles northward of Ras Mavemavili, towards the southern end of Boma reef.

Mkadini bay is a slight indentation in the coast, about 2 miles southward of Ras Kilifi ; it is filled by a shoal, the outer edge of which extends about 6 cables from the head of the bay.

Chart 866, plan of Moa bay or Gomani bay.

Moa or Gomani bay.—Off-lying danger.—Buoys.—Moa or

Charts 664, 669, 597, 748b, 2483.

Chart 866, plan of Moa bay or Gomani bay.

Gomani bay is entered between Ras Kilifi and Ras Kungunganda, about 1¼ miles northward. Both entrance points are fronted by drying reefs, which also extend some distance off the shores of the bay, leaving a channel between them so narrow that it is only available for small craft. The town of Moa (*Lat. 4° 46′ S., Long. 39° 10′ E.*) is situated at the head of the bay, about 2¼ miles westward of Ras Kungunganda, in the vicinity of a large coconut and sisal plantation, and the Custom House, a small two-storeyed building in the town, is prominent from seaward. *See* view facing page 421.

There are depths of from 7 to 11 fathoms ($12^{m}8$ to $20^{m}1$) in the channel for about one mile within the entrance, whence the depths decrease rapidly to less than 3 fathoms ($5^{m}5$).

Fungu Kivani, a shoal with a least depth of one fathom ($1^{m}8$) over it, lies about 9 cables eastward of Ras Kilifi.

A red can buoy, moored on the southern side of the entrance channel about 8 cables north-north-westward of Ras Kilifi, marks the edge of the shoal water which extends northward from that point.

On the northern side of the inner part of the channel, a black conical buoy, moored 9 cables west-south-westward of Ras Kungunganda, marks the edge of the shoal water which extends southward from Kirui island (page 423).

Anchorages.—Directions.—Anchorage may be obtained between Fungu Kivani and the coast, in depths of about 15 fathoms ($27^{m}4$).

There is good anchorage for small craft in Moa bay, about one mile within the entrance to the channel.

Chart 1390.

Kilulu, described on page 412, in line with Ras Kungunganda, bearing 272°, leads from seaward to the entrance to Moa bay, in depths of not less than 10 fathoms ($18^{m}3$), passing about 1½ miles northward of Mwamba Kitugamue.

Chart 866, plan of Moa bay or Gomani bay.

Town.—The town of Moa stands on very low ground and is unhealthy for Europeans; the Custom House is the only masonry building in the town.

Limited supplies of fresh provisions may usually be obtained; the water is bad.

When landing at Moa, caution is necessary on account of numerous submerged stumps of mangrove trees, which front the shore.

Chart 1390.

RAS KUNGUNGANDA TO RAS MWA KISENGE.—Ras Kungunganda to Chale point.—Aspect.—Between Ras Kungunganda and Chale point, about 28 miles north-eastward, the coast is low and well wooded and consists of low, rocky cliffs alternating with sandy beaches, and is bordered by mangroves and a fringing reef; occasional clumps of trees stand out conspicuously from the general uniform level, and the off-lying islands stand out prominently.

The mountains and hills backing this stretch of coast will, in clear weather, be the first land visible from seaward, and the following may be readily identified.

Kilulu, 877 feet ($267^{m}3$) high, a rounded hill, situated about 5 miles westward of Ras Kungunganda (*Lat. 4° 46′ S., Long. 39° 13′ E.*), at the northern end of the Kerimba range, which has an elevation

Chart 1390.

of about 450 feet (137^{m}2); Jombo and Mrima, two isolated, conical mountains, situated about 19 and 17 miles, respectively, westward of Chale point, and Kiruki, another isolated, conical peak, 622 feet (189^{m}6) high, about 2¼ miles north-eastward of Mrima. The summit of Jombo is very sharp when bearing more than 286°, but it becomes flat and ill-defined when the bearing is less; the summit of Mrima is a truncated cone.

Chart 866, Moa or Gomani bay to Funzi bay.

Inner channel.—Between Ras Kungunganda and Ras Wasin, about 14 miles east-north-eastward, the coast forms a wide bay which is fronted by Wasin island and the extensive reef surrounding it, and by numerous detached islets and reefs. An inner channel, known as the Wasin channel, leads between Wasin island and the mainland. There is a least depth of 33 feet (10^{m}1) in the fairway of the Wasin channel and its approaches, and the track recommended is indicated by pecked lines on chart 866.

Coast.—Off-lying dangers.—Between Ras Kungunganda and the entrance to Mto Yimbo, about 5 miles northward, the coast is low and rocky, with a few sandy beaches, and is formed by the eastern side of Kirui, an island which appears to be part of the mainland, being separated from it by a narrow and intricate canoe passage, which connects Mto Yimbo to Mto Kirui at the northern end of Moa bay. The coast is fringed by a drying reef which extends as much as 6 cables offshore in places.

Chart 866, plan of Moa bay or Gomani bay.

Mwezi, a reef which dries 2 feet (0^{m}6), lies about one mile offshore, about 1¾ miles east-north-eastward of Ras Kungunganda.

Chart 866, Moa or Gomani bay to Funzi bay.

Kipwa Mtu, and the dangers eastward and north-eastward of it, are described on page 424.

The reefs of Minyani, two patches of reef which dry 3 feet (0^{m}9), and always show clearly, lie about 4 miles east-north-eastward of Ras Kungunganda, about 1½ miles offshore.

Mto Yimbo.—Mto Yimbo is the southernmost of a series of mangrove-lined creeks through which Mto Umba enters the sea. Although deep during the rainy season the depths in Mto Umba are very shoal at other times, and it does not appear to be navigable at any season. The channel into Mto Yimbo is about one cable wide at the entrance, which is barred by a reef and sandbank. Within the entrance, there are depths of from one to 2 fathoms (1^{m}8 to 3^{m}7), but the channel gradually decreases in depth and width as it leads round the northern side of the island of Kirui, and connects with Mto Kirui and Moa bay by a canoe passage.

The village of Yimbo is situated on the northern bank of Mto Yimbo, about 3 cables westward of Ras Yimbo, the northern entrance point (*Lat. 4° 41′ S., Long. 39° 13′ E.*).

Hori Vanga.—Hori Vanga, a creek entered about 1½ miles north-eastward of the entrance to Mto Yimbo, is a much smaller creek, with an entrance similarly barred. It is about 15 yards (13^{m}7) wide and has depths of from 4 to 5 feet (1^{m}2 to 1^{m}5). A single palm tree stands on the southern bank, close within the entrance and near the ruins of the old town of Vanga. The present town is situated on an islet, connected by a causeway to the same bank, about 3 cables

Chart 866, Moa or Gomani bay to Funzi bay.

farther north-north-westward, and, being built with a mangrove swamp immediately behind it, is unhealthy. Abreast the town, the creek is about half a cable wide at high water, at which time there is a depth of 12 feet (3m7) in a narrow and tortuous channel which extends for about 3 miles above the town, when it terminates in mangrove swamps. Boats entering Hori Vanga, should pass eastward of an islet in the entrance.

Landing in Hori Vanga is only possible at a sea wall abreast the town, where dhows can berth at high water ordinary spring tides.

There are several wells at Vanga, but during the dry season, water is obtained about 2 miles higher up the creek. Rice is largely cultivated and exported to Zanzibar.

Coast.—Island and dangers.—Between the entrance to Hori Vanga and Ras Kiromo (*Lat. 4° 38′ S., Long. 39° 18′ E.*), about 4½ miles east-north-eastward, the coast is a succession of mangrove creeks, of which the largest are Mto Juma, Mto Alleyne and Mto Pongwe. They are all of no importance and contain only a few scattered huts.

This stretch of coast is fronted by a bank, on which the depths are less than 3 fathoms (5m5), which extends as much as 3 miles offshore in places, and has, on its outer part, an extensive drying reef, at the centre of which is the island of Sii ; Marembo, a reef which dries from 2 to 3 feet (0m6 to 0m9), lies on the above bank, about half a mile eastward of the entrance to Hori Vanga.

Sii, an uninhabited island, thickly covered with mangroves which, at its centre, had attained an elevation of 95 feet (29m0) in 1888, lies about 2½ miles eastward of the entrance to Hori Vanga. The coral reef on which the island stands, dries from 4 to 6 feet (1m2 to 1m8) and extends nearly 9 cables eastward and southward of the island, on which sides it is moderately steep-to, but the north-western end of the reef is connected to the coast by a ridge, which is reported to dry.

Anchorages.—Anchorage may be obtained, in a depth of 6 fathoms (11m0), sand and shells, about 2 miles east south-eastward of the entrance to Mto Yimbo, in the position indicated on the chart. Smaller craft may obtain anchorage about one mile south-eastward of the entrance, in depths of about 3¾ fathoms (6m9) as shown on the chart.

There is also anchorage for small craft about 1¼ miles off the entrance to Hori Vanga, in depths of about 3½ fathoms (6m4).

South-western approach to Wasin channel.—Dangers.—Wasin channel is approached from south-westward between the reefs lying off the coast between Ras Kungunganda and Ras Kiromo, which are described above, and numerous detached reefs, most of which dry, which extend as much as 8 miles south-westward of Wasin island.

Kipwa Mtu and Bunjuu are the southernmost dangers on the eastern side of the track. Kipwa Mtu, which has a least depth of 2 feet (0m6) over it, lies nearly 3 miles east-north-eastward of Ras Kungunganda ; Bunjuu, situated about 3½ miles eastward of Ras Kungunganda, dries 2 feet (0m6).

Mwamba Midira, a large reef which dries about 4 feet (1m2), is situated about 5 miles east-north-eastward of Ras Kungunganda.

A reef, which dries one foot (0m3), lies about 5 cables eastward of Mwamba Midira.

Charts 1390, 664, 669, 597, 748b, 2483.

Chart 866, Moa or Gomani bay to Funzi bay.

Mpwa, a similar reef, which dries 3 to 4 feet (0^{m}9 to 1^{m}2), about 1½ miles north-eastward of Mwamba Midira, lies on the eastern side of the track, about 3 miles southward of Ras Kiromo. Foul ground, with numerous shoal patches and sunken rocks,. extends between Mwamba Midira and Mpwa.

Chart 866, Moa or Gomani bay to Funzi bay and plan of Wasin channel.

Wasin channel.—Dangers.—Beacon.—Wasin channel is entered from westward between Ras Kiromo and the western extreme of Mwamba Cha, a drying reef which extends nearly 3 miles west-south-westward of Wasin island. The northern side of the channel is formed by the coast between Ras Kiromo and Ras Wasin, about 6 miles eastward. This stretch of coast is bordered by mangroves and fringed by a reef which extends from one to 2 cables offshore. There is a clump of trees, 90 feet (27^{m}4) high, situated on the coast about 8 cables eastward of Ras Kiromo, and Shungilanzi an islet, 30 feet (9^{m}1) high, resembling a haycock, stands on the coastal reef, about 5 cables westward of Ras Wasin; there is a slight projection of the fringing reef, abreast a small sandbank, about 7½ cables westward of Shungilanzi.

The southern side of the channel is formed by Wasin island and Mwamba Cha, the reef extending west-south-westward of it.

Wasin island is a coral island which lies about one mile southward of, and parallel with, the coast for about 2½ miles westward of Ras Wasin (*Lat. 4° 39′ S., Long. 39° 25′ E.*); the latter point and Ras Kisimga Mkono, the north-eastern extreme of Wasin island, about 7½ cables south-south-westward of Ras Wasin, form the eastern entrance points to Wasin channel. The island is densely wooded, the tops of the trees reaching an elevation of from 70 to 94 feet (21^{m}3 to 28^{m}7).

Mwamba Cha is an extensive drying reef which fronts the western coast of Wasin island and extends about 3½ miles west-south-westward of Ras Mundini, the north-western extreme of the island, situated about 3½ miles east-south-eastward of Ras Kiromo.

Howard rocks are a group of rocks, sunken and awash, situated on the south-eastern side of the track, about 2½ miles west-south-westward of Ras Mundini.

A 22-foot (6^{m}7) patch lies in the fairway of Wasin channel, close northward of the track, about 7½ cables north-westward of Ras Mundini (*Lat. 4° 39′ S., Long. 39° 22′ E.*).

Chart 866, plan of Wasin channel.

Between Ras Mundini and Ras Kisimga Mkono, about 2½ miles eastward, the northern coast of Wasin island is fringed by a reef which extends from one to 2 cables offshore; a pinnacle rock, which dries 10 feet (3^{m}0), lies close off Ras Kisimga Mkono.

A beacon, consisting of a white, square pillar, stands on Ras Mundini.

Wasin town.—Anchorage.—The town of Wasin is situated on the northern coast of the island, about 5 cables south-eastward of Ras Mundini; it contains two mosques among a number of huts.

Fresh provisions, excepting fruit and vegetables, may be obtained. Water obtained from wells on the island, is brackish, and that required for drinking is transported from wells on the mainland abreast the town. Large numbers of cowries may be found on Mwamba Cha.

Charts 1390, 664, 669, 597, 748b, 2483.

Chart 866, plan of Wasin channel.

The anchorage recommended is in a depth of 7 fathoms (12^{m}8), about 4 cables offshore, with the town bearing about 200° ; eastward of this position, the swell is felt during the period of the south-west monsoon.

The reef which fronts the town makes landing difficult at low water.

Chart 866, Moa or Gomani bay to Funzi bay.

Dangers in eastern approach to Wasin channel.—Ship shoals, several shoals, with a least depth of 3 fathoms (5^{m}5) over them, are situated nearly 3 miles eastward of Ras Kisimga Mkono, and are the outermost dangers in the eastern approach to Wasin channel.

Lockyer patch, a shoal with a least depth of 9 feet (2^{m}7) over it, lies about 2 miles east-south-eastward of Ras Kisimga Mkono.

Chart 866, plan of Wasin channel.

Stork patch, a shoal with a depth of 6 feet (1^{m}8) over it, lies about 2 cables east-north-eastward of Ras Kisimga Mkono.

Chart 866, Moa or Gomani bay to Funzi bay.

Mwamba Waga, a reef which dries about 8 feet (2^{m}4), fronts the coast between Ras Wasin and Ras Rashid, about 1½ miles north-north-eastward, and extends about 4 cables offshore, and a detached 3-fathom (5^{m}5) patch, lies about 1¼ miles north-eastward of Ras Wasin, about half a mile offshore.

Islands and dangers southward of Wasin island.—The reef surrounding Wasin island extends as much as 8 cables southward of its southern coast, but only about one cable off its eastern coast.

Southward of Wasin island, a chain of islets and reefs extends east-north-eastward from Mwamba Midira, described on page 424, towards Lockyer patch ; the islets in this chain stand out prominently to vessels making the land from southward.

Mako Kokwe (*Lat. 4° 44′ S., Long. 39° 20′ E.*), a reef which dries about 3 feet (0^{m}9), lies about 3½ miles south-south-westward of Wasin island and about 1¼ miles eastward of Mwamba Midira.

Kisiti, a small islet with a few weather-beaten bushes, which, in 1888, were about 12 feet (3^{m}7) high, lies about 3 miles southward of Wasin island and about 2 miles eastward of Mako Kokwe. The islet stands near the western end of a reef, which dries about 6 feet (1^{m}8). Some patches, with depths of 13 and 16 feet (4^{m}0 and 4^{m}9) over them, lie in the channel between Kisiti and Mako Kokwe.

Pungutiayu is a wooded island, standing on a reef which dries about 6 feet (1^{m}8), situated about 1¾ miles southward of the south-eastern extreme of Wasin island. A group of wooded islets, called Pungutiachi, stands on a similar reef about one mile northward of Pungutiayu. As stated above, these islands stand out well against the land when seen from southward.

Current and tidal streams.—Very little current is felt inside the reefs and close inshore within the bight between Ras Kungunganda and Ras Wasin. In Wasin channel, however, the current is sufficiently strong to make the east-going tidal stream, or that of the falling tide, attain a maximum rate of from 1½ to 2½ knots during springs, although the tidal stream of the rising tide, which sets westward through Wasin channel, only neutralises or slightly overcomes the current.

Heavy tide rips are found off the out-lying islands and reefs, and, during strong winds, they cause a heavy, confused sea.

Charts 1390, 664, 669, 597, 748b, 2483, *Chart 866, Moa or Gomani bay to Funzi bay and plan of Wasin channel.*

Directions for inner channel.—Vessels from southward should pass about 4 cables south-eastward of Mwezi, and should then steer for the clump of trees, about 8 cables eastward of Ras Kiromo, bearing 035°.

If bound for the anchorage off Mto Yimbo or Hori Vanga, course may be shaped for these anchorages after passing between Mwamba Midira and Minyani.

If bound for Wasin channel, vessels should continue to steer 035° for the clump of trees until between Mpwa and the island of Sii, when course should be altered slightly eastward to avoid the north-eastern extreme of the reef surrounding Sii. When Ras Wasin is seen open northward of Ras Mundini, Howard rocks will have been passed, and a mid-channel course may then be shaped, passing on either side of the 22-foot (6^{m}7) shoal, situated about 7½ cables north-westward of Ras Mundini. After passing this shoal, course may be shaped for the anchorage off Wasin, or, if passing through the channel, a mid-channel course may be shaped until nearly abreast Shungilanzi, when course should be altered slightly towards the northern side of the channel, to avoid Stork patch. When Pungutiayu is seen open eastward of the Pungutiachi group, Stork patch will have been passed, and vessels may then proceed northward by the inshore channel, described on page 429, or seaward, using the directions given below, reversed.

Chart 1390.

Vessels from south-eastward, wishing to enter Wasin channel from south-westward, should approach with Kilulu, described on page 412, in line with Ras Kungunganda, bearing 272°. When Jombo is bearing about 346° and open westward of Sii, course should be shaped to pass midway between Bunjuu and Mwamba Midira (*Lat. 4° 44′ S., Long. 39° 18′ E.*), which will be visible at low water, whence the directions given above, should be followed.

Vessels from south-eastward, approaching the eastern entrance to Wasin channel, should bring the mountains of Jombo and Mrima in line, bearing 315°, and should keep on this line until Ras Rashid can be identified, when Jombo should be brought to bear 313°, and just open northward of Ras Rashid, which line leads close northward of Ship shoals. When Ras Mundini bears 268°, course should be shaped towards Shungilanzi, and the directions given above, should be followed, in the reverse direction.

Chart 866, Moa or Gomani bay to Funzi bay.

Funzi bay.—Dangers.—Funzi bay is entered between Ras Rashid and Ras Kanda, about 3¼ miles north-eastward ; in 1888, a conspicuous clump of trees, 126 feet (38^{m}4) high, stood on Ras Kanda. The shores of the bay are bordered with mangroves and its head is a mangrove swamp, on either side of which, Mto Mamoja and Mto Uvinje flow into the north-eastern and north-western corners of the bay. There is a sandy beach at the entrance to Mto Mamoja and the village of Funzi, with a flagstaff at its southern end, stands on the eastern side of the entrance to Mto Uvinje.

A considerable part of Funzi bay is filled by a 3-fathom (5^{m}5) bank, which fronts its shores and extends as much as 1¾ miles offshore at the entrance to Mto Uvinje ; M'kame, a reef which dries about 3 feet (0^{m}9), lies on the outer part of this bank, about 1¾ miles south-westward of Ras Kanda.

Charts 664, 669, 597, 748b, 2483.

Chart 866, Moa or Gomani bay to Funzi bay.

M'dua, a detached reef, which dries 2 feet (0^m6), lies in the south-western part of the bay, about 6 cables north-eastward of Ras Rashid; close westward of M'dua, there is a sandbank which dries 2 feet (0^m6).

Anchorage.—Directions.—Sheltered anchorage may be obtained, in depths of from 4 to 5 fathoms (7^m3 to 9^m1), sand, between the reefs of M'dua and M'kame.

A narrow anchorage, which is much used by dhows, is situated off the village of Funzi, but this anchorage is not recommended as the space is restricted and the tidal streams are strong. It is approached through Mto Vikuarini, a 2-fathom (3^m7) channel across the bank extending south-westward of Ras Kanda.

Kiruki, described on page 423, bearing 318°, and open westward of some casuarina trees within the head of the bay, leads between the reefs of M'dua and M'kame to the anchorage; the latter reef always breaks.

Tidal streams.—There is a strong indraught into Funzi bay during the period of the rising tide.

Charts 1390, 1389.

Coast.—Beacon.—Light.—Between Ras Kanda and Chale point, about 10 miles north-north-eastward, the coast is rocky and fringed with reef. On the southern part of this stretch, the coastal reef is narrow, except about 2½ miles northward of Ras Kanda, where Sambweni reef extends about 5 cables offshore. Sambweni beach stretches for about 2 miles northward of Sambweni reef, whence for about a further 2½ miles north-eastward to the entrance to Maftaha (Gaze) bay, the coast is fronted by a narrow ridge of reef, which extends about 7 cables offshore.

Chale island, a wooded island which is noticeable on account of its high trees, lies close southward of Chale point; it stands on the northern end of Chale reef, which dries 4 feet (1^m2) in places and extends about 1¾ miles southward of Chale island (*Lat. 4° 27′ S., Long. 39° 32′ E.*).

Maftaha bay, a wide indentation in the coast, completely filled by a shoal bank, is situated westward of Chale point. Several small villages stand among coconut palms along this coast, and a hospital, consisting of a group of white buildings with red roofs, is situated about half a mile northward of the northern end of Sambweni beach, while a thickly wooded coast range, 322 feet (98^m1) high, stands nearly 4 miles within the coast westward of Sambweni beach.

A white beacon stands on the coast, about 4½ miles south-westward of Chale point.

A light is exhibited, at an elevation of 91 feet (27^m7), from a white, steel, framework tower, 75 feet (22^m9) in height, on the southern extremity of Chale island.

Off-lying reefs.—Several patches with depths of from 5 to 6 fathoms (9^m1 to 11^m0), are found for about 3 miles northward of Ship shoals, but there are no off-lying dangers between Ship shoals and Wimbi reefs.

Wimbi reefs consist of four detached patches, with depths of less than 6 feet (1^m8) over them, and some shoal ground about one mile eastward of the northern patches. The reefs lie parallel with the coast, about 1¼ miles offshore, the southernmost patch being about 2 miles north-eastward of Ras Kanda; the passages between the reefs should not be used.

Charts 664, 669, 597, 748b, 2483.

Charts 1390, 1389.

Several patches, with depths of from 2¼ to 3 fathoms ($4^{m}1$ to $5^{m}5$) over them, lie in the northern part of the channel between Wimbi reefs and Chale reef.

Inshore channel.—Directions.—There is a good navigable channel along the coast inside Wimbi reefs, and vessels of light draught from northward, desiring to avoid the current, are recommended to use this channel, which is entered about one mile southward of Chale reef; caution is necessary to avoid the shoal patches in the northern part of the entrance. The track recommended is indicated by pecked lines on chart 1390.

Vessels should approach with Jombo bearing 280°, which leads through the entrance; the white beacon is a useful mark, as, when in line with Jombo, bearing 279°, it indicates the position of the southernmost 3-fathom ($5^{m}5$) patch. When Ras Kanda bears 209° it should be steered for on that bearing until abreast the 322-foot ($98^{m}1$) coast range, westward of Sambweni beach, when course should be shaped to pass about half a mile eastward of Ras Kanda, passing between Sambweni reef and the southern Wimbi reef.

If proceeding through Wasin channel, when abreast Ras Kanda, course should be shaped to pass about one mile off Ras Wasin, whence the directions given on page 427 should be followed.

Chart 1389, 616.

Coast.—Between Chale point and Ras Mwa Kisenge the southern entrance point to the port of Mombasa, about 23 miles north-north-eastward, the coast is generally low and wooded, with overhanging, cliffy, coral points and sandy beaches. For about 12 miles northward of Chale point, the coast is fronted by a narrow reef at from 5 to 9 cables offshore, with a narrow boat passage intervening; thence to Black Cliff point, about 5 miles farther northward, the reef fringes the coast and extends up to 5 cables offshore.

About 5 miles southward of Black Cliff point, Mwackema river, which is navigable only by canoes, flows out over the reef; the river mouth is not visible from seaward.

Black Cliff point (*Lat. 4° 11′ S., Long. 39° 38′ E.*) is only a slight projection from the foot of a hill on which the tops of the bushes rise to an elevation of 105 feet ($32^{m}0$); in 1943, a conspicuous bread-fruit tree stood on the summit.

Chart 666.

PORT OF MOMBASA AND APPROACHES.—Port Limits.—The port of Mombasa is entered between Ras Mwa Kisenge and Ras Kunwongbe, about 2¼ miles north-eastward. Close within the entrance is Mombasa island, which separates Port Mombasa from Port Kilindini and Port Reitz; Ras Serani, the south-eastern extreme of Mombasa island, lies at the head of the entrance to the port, nearly one mile north-north-eastward of Ras Mwa Kisenge.

Mombasa island has a level surface, from 40 to 70 feet ($12^{m}2$ to $21^{m}3$) in height, and, although much built over, is well-covered with trees, chiefly mangoes and baobabs. Its coast is steep-to with the exception of the northern and north-western sides, where Makupa causeway carrying the railway, a water pipe-line and the roadway, connects the island with the mainland. The town of Old Mombasa (Mvita) is situated on the eastern side of the island abreast Port Mombasa,

Charts 664, 669, 597, 748b, 2483.

Chart 666.

but the space in the port is narrow and congested, and it is now only used by dhows and small coasting vessels. Port Kilindini, with its extension, Port Reitz, is situated on the western side of Mombasa island, and is available for the largest vessels.

Charts 666, 616.

The port of Mombasa includes Port Kilindini, Port Mombasa, Port Reitz, Port Tudor and the whole of the waters encircling Mombasa island and the coast of the mainland north-westward of an imaginary line, drawn from Ras Kunwongbe to a point on the coast 5 cables southward of Ras Mwa Kisenge (*Lat. 4° 05′ S., Long. 39° 40′ E.*).

Chart 1389, 616.

Aspect.—The Shimba range, rising to over 1,000 feet (304^{m}8), lies about 10 miles inland between Chale point and Ras Mwa Kisenge. A gap, known as Mombasa gap, separates Shimba range from a flat range northward of it ; the gap lies between two hills, the northern of which has an elevation of 950 feet (289^{m}6) and the southern one an elevation of 970 feet (295^{m}7). Mombasa gap does not open until bearing less than 265°, when it becomes a conspicuous mark for making the port of Mombasa.

A range of hills, about 400 feet (121^{m}9) high, is situated about midway between Shimba range and the coast. On this range, about 4½ miles south-westward of Black Cliff point, there was, in 1948, a conspicuous clump of trees. Tangila, the highest summit of this range is 426 feet (129^{m}8) high, and lies nearly 3½ miles north-westward of Black Cliff point ; below and north-eastward of this summit there is a triangular target beacon, painted in black and white stripes, which stands at an elevation of 346 feet (105^{m}5) and is visible when bearing less than about 280°. Nearly 1¼ miles northward of Tangila there is a detached rounded summit, 340 feet (103^{m}6) high, which is a good mark when conditions of light render objects difficult to identify.

Nguu Tatu, or the hummocks of Mombasa, three low but conspicuous hills, are situated about 6 miles northward of Ras Mwa Kisenge ; the centre and highest hill has a clump of trees on its summit, the tops of which are 440 feet (134^{m}1) in height, and, from the north-eastward they appear close together. These hills form one of the best marks for making Mombasa from seaward.

See view on chart 616.

Chart 666.

The white buildings and red roofs of Mombasa town show up well in clear weather when the sun is in the east. A black water tank, about 5½ cables northward of Ras Kunwongbe and another water tank, 115 feet (35^{m}0) high, about 4 cables eastward of Mackenzie point (*Lat. 4° 04′ S., Long. 39° 41′ E.*) are conspicuous.

Within the entrance, a grey dome about 6¾ cables north-north-westward of Ras Serani and three-quarters of a cable west-north-westward of the white domed cathedral, is conspicuous, as is also a school, a large white two-storeyed building with a red roof, about 9 cables northward of the cathedral.

Chart 666, 616.

On a closer approach, a sandy beach extending southward of the entrance, will indicate the position of the cliffy point of Ras Mwa Kisenge and the leading beacons for the main channel will indicate the position of Ras Serani, which is also cliffy. Northward of the entrance,

Charts 664, 669, 597, 748b, 2483.

Charts 666, 616.

Ras Kunwongbe is a bluff, cliffy point from which a sandy beach extends west-south-westward for about 8 cables to near George rock, a detached rock, 12 feet (3^{m}7) high, close inshore. From George rock to Mackenzie point, the eastern entrance point to Port Mombasa, about 5 cables north-north-eastward of Ras Serani, the coast consists of low cliffs.

Dangers in approach.—Lights.—Beacons.—Buoyage.—Andromache reef, which dries, fringes the coast from Ras Mwa Kisenge for about a mile southward and extends up to a distance of about 7½ cables offshore.

A beacon, consisting of a concrete post, about 14 feet (4^{m}3) high, stands on the edge of the reef about 1¾ miles southward of Ras Mwa Kisenge.

Depths of 6 fathoms (11^{m}0), or less, extend about 6½ cables north-eastward from Ras Mwa Kisenge.

An extensive detached bank, with depths of 6 fathoms (11^{m}0) or less over it, lies with its northern end 6 to 12 cables eastward of Ras Mwa Kisenge and its south-eastern corner nearly 1½ miles south-eastward of Ras Mwa Kisenge. The outermost shoal patch on the northern end of the bank, about 8 cables eastward of Ras Mwa Kisenge, has a least depth of 16 feet (4^{m}9). Between this patch and the coast, there is a rocky shoal, also with a least depth of 16 feet (4^{m}9), on which there is generally an uneasy sea.

A detached 33-foot (10^{m}1) patch and a 30-foot (9^{m}1) coral patch lie off the northern end of the bank about 7½ and 9 cables east-north-eastward, respectively, of Ras Mwa Kisenge (*Lat. 4° 05′ S., Long. 39° 40′ E.*).

On the south-eastern part of the bank, there is a 19 foot (5^{m}8) patch and several patches with depths of from 21 to 24 feet (6^{m}4 to 7^{m}3).

A 31-foot (9^{m}5) patch lies close north-eastward of the leading line and nearly 4 cables east-south-eastward of Ras Serani front leading light (*Lat. 4° 04′ S., Long. 39° 41′ E.*).

In the fairway of the entrance channel and from 1¼ to 1¾ miles eastward of Ras Mwa Kisenge are several shoals, with depths of from 32 to 35 feet (9^{m}7 to 10^{m}7) over them, the positions of which can best be seen on the chart.

Turning buoy, a black can light-buoy surmounted by a staff and cage, fitted with a radar reflector and exhibiting a *white flashing* light *every three seconds*, is moored nearly half a cable southward of the intersection of the leading lines of the entrance channel and about 1¼ miles eastward of Ras Mwa Kisenge.

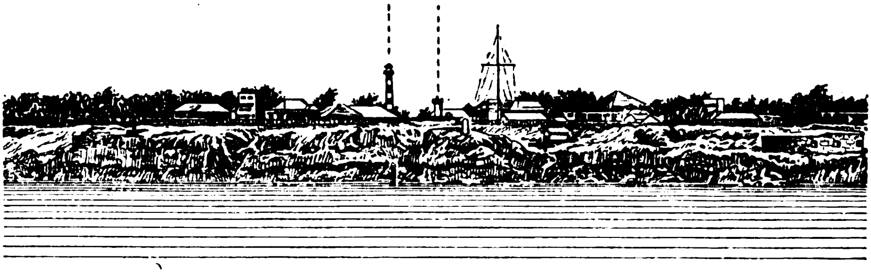
On the northern side of the entrance, the coast between Mackenzie point and Ras Iwatine, about 4 miles north-eastward, is fronted by the Leven reefs, which extend as much as 1¼ miles south-south-eastward of Ras Kunwongbe ; the eastern edge of these reefs is moderately steep-to, but depths of less than 5 fathoms (9^{m}1) extend as much as 1½ miles southward of Ras Kunwongbe, and a 4¾-fathom (8^{m}7) rocky patch, lies about 1¾ miles southward of the latter point, and about three-quarters of a cable northward of the fairway of the entrance channel.

A light is exhibited, at an elevation of 36 feet (11^{m}0), from a white iron, framework tower, 23 feet (7^{m}0) in height, situated on Ras Iwatine.

Charts 1389, 664, 669, 597, 748b, 2483.

Chart 666.

Leading lights are established on Ras Serani. The front light is exhibited, at an elevation of 82 feet ($25^{m}0$) from a white steel tower, 38 feet ($11^{m}6$) in height, situated about 8 cables north-north-eastward of Ras Mwa Kisenge. The rear light is exhibited, at an elevation of 147 feet ($44^{m}8$), from a white stone tower with black horizontal bands, 108 feet ($32^{m}9$) in height, situated about 1¾ cables west-north-westward of the front light. These lights in line, bearing 301°, lead through the main channel into the port, to the entrances to Port Kilindini and Port Mombasa.


Rear light.
Front light.

Ras Serani leading lights.
(*Original dated* 1953.)

A white concrete pillar stands on the line of the leading-light beacons about three-quarters of a cable east-south-eastward of the front leading light-beacon.

A beacon, 27 feet ($8^{m}2$) in height, consisting of a black mast surmounted by a white triangle, stands on the coast about 3¼ cables south-westward of Ras Kunwongbe.

Mackenzie point, in line bearing 329° with the north-eastern corner of the conspicuous school with the red roof, mentioned on page 430, leads through the entrance channel and up to the alignment of Ras Serani leading light-beacons (*Lat. 4° 04′ S., Long. 39° 41′ E.*).

Signal station.—A signal station, with which vessels can communicate by the International Code of Signals, is situated on Ras Serani; it consists of a red rectangular building, 15 feet ($4^{m}6$) in height, with a flagstaff.

Outer anchorage.—**Prohibited anchorage.**—Anchorage may be obtained in depths of from 7 to 8 fathoms ($12^{m}8$ to $14^{m}6$), with the water-tank about 5½ cables northward of Ras Kunwongbe bearing about 004° and Ras Serani rear leading light-structure bearing 296°, distant 15 cables; this anchorage, although usually rough for boat work, may generally be considered safe for large vessels, except during the strongest winds which generally occur at spring tides during the south-west monsoon.

Anchorage is prohibited anywhere north-westward of the pecked line on the chart drawn across the entrance about 1½ miles south-eastward of Ras Serani; anchorage is prohibited in the entrance to Port Mombasa for a distance of about 7 cables northward of Ras Serani, and also in the entrance to Port Kilindini as far as Ras Bofu, nearly 1½ miles west-north-westward of Ras Mwa Kisenge (*Lat. 4° 05′ S., Long. 39° 40′ E.*).

Charts 1389, 664, 669, 597, 748b, 2483.

Chart 666.

No vessel shall approach within 12 cables of Ras Serani without permission.

Pilotage.—Signals.—Pilotage is compulsory for merchant vessels, westward of a line joining Ras Kunwongbe to a position 5 cables southward of Ras Mwa Kisenge. No vessel of 200 tons register or upwards, may enter, leave or be moved or berthed in the port of Mombasa, without having a pilot on board, except such vessels as may be exempted by law or by the High Commissioner.

Pilots are available between sunrise and sunset and are also available at night, provided arrangements have been made in advance by radio. As much notice as possible should be given, but entry at night is not recommended.

The pilot boat will always endeavour to meet vessels about 1½ miles from Ras Serani. Vessels approaching the entrance will find that they will lose the current setting northward along the coast, when about 1½ miles from Ras Serani, and should await the pilot boat in this position. In the event of the pilot boat being unduly delayed, vessels may anchor as convenient in the outer anchorage, northward of the line of Ras Serani leading beacons.

In the event of weather or other conditions making boarding by a pilot impracticable, Masters of vessels concerned, will receive instructions as to their course, from Ras Serani signal station.

Vessels exempt from pilotage, shall show the following signals when entering or leaving the port of Mombasa :—

By day.—Flag " H " of the International Code of Signals, displayed at the dip.

At night.—Three lights, disposed vertically, the upper light being *red*, and the two lower lights, *white*.

Port regulations.—Masters of vessels visiting the port of Mombasa should obtain a copy of the regulations from the Port Authorities. The following are extracts from the Harbour (Amendments) Regulations, 1936 :—

1. No person shall take or attempt to take any ship into Port Mombasa at the same time as another ship is leaving ; the ship about to enter shall remain outside, until the ship leaving has passed her.
2. No person shall take or attempt to take any ship not having a pilot on board, within a distance of 12 cables from Ras Serani lighthouse, in disobedience of the signal given below :—
   A black flag displayed at the masthead by day, and at night, three *red* lights, disposed vertically, shown from the flagstaff at Ras Serani, indicates that entry into the harbour is prohibited.
3. No person shall take or attempt to take any ship out of, or leave any anchorage in Port Kilindini in disobedience of the signals given below :—
   A black ball, by day, and, at night, three lights, the upper and lower *white*, the centre *red*, disposed vertically, shown from the flagstaff at Ras Kilindini (*Lat. 4° 04′ S., Long. 39° 39′ E.*), indicates that departure from the harbour or from any anchorage is prohibited.
4. Native vessels and small craft shall not be anchored in such a position as to obstruct the fairway.
5. (*a*) The Master of any ship (other than an exempted ship) shall

Charts 1389, 664, 669, 597, 748b, 2483.

not cause or permit his ship to enter, leave, or be berthed or moored in any compulsory pilotage harbour, without having a pilot, appointed by the Port Management, on board. If any ship (other than an exempted ship), in circumstances in which pilotage is compulsory, is not under pilotage as required by this regulation, the Master of the ship shall be guilty of an offence.

Note.—When two or more ships are approaching the pilot ground, the pilot boat will indicate the number of pilots she has on board, by Aldis lamp. This is to be taken as an additional warning that a ship for which a pilot is not available, is to remain outside the distance of 12 cables prescribed in subsection (*b*) of this regulation.

(*b*) Every ship not exempted from pilotage, arriving off the port of Mombasa, shall await the arrival of the pilot launch on the outer leading line, and at a distance of approximately, and not less than, 12 cables from Ras Serani lighthouse (*Lat. 4° 04′ S., Long. 39° 41′ E.*), so that after the pilot has boarded, the ship may gather sufficient headway for manœuvring before arriving at the entrance channels.

(*c*) In the event of weather or other conditions making the boarding by a pilot impracticable, the Master of a ship concerned, will receive instructions as to his course from Ras Serani signal station, or through his agents by radio.

The following are extracts from the Harbours Regulations of 1928, a copy of which should be obtained on arrival:—

(*i*) Owners or agents of a ship that purposes to call at a harbour shall, as early as possible, give notice in writing to the Port Management on the form prescribed, of the expected date and time of arrival of the ship, and shall give particulars in such notice, as to the nature and quantity of cargo, and other matters of importance.

(*ii*) Before entering a port or harbour, every ship shall display the following flags:—

- (*a*) Her national colours, which she shall fly from 0800 to sunset.
- (*b*) The ship's signal letters in the International Code of Signals.
- (*c*) " Q " flag of the International Code of Signals, until the Port Health officer shall have given pratique.
- (*d*) " I " flag of the International Code of Signals, until the Immigration Department's formalities shall have been observed.
- (*e*) " N " flag of the International Code of Signals, if animals are on board.
- (*f*) " B " flag of the International Code of Signals, if carrying dangerous goods.

(*iii*) All ships entering the port of Mombasa shall await the arrival of the Port Health officer, or his representative, before having any communication with the shore, or with any other ship or boat, except the pilot boat or the boat of a customs officer.

(*iv*) Every ship shall occupy the berth assigned to her by the Port Management, whether at a quay or elsewhere, and shall

Chart 666.

remove to any other berth as it may direct, and generally, all Masters or persons in charge, shall obey the directions of the Port Management.

(*v*) No wire rope, hemp rope, dunnage, mats, wood, dirt, ballast, ashes, earth, stones, offal or rubbish of any sort whatsoever, shall be thrown or allowed to fall or drift into the water or harbour.

(*vi*) No oil of any description shall be discharged into, or allowed to escape, into a harbour, and oil-fuel burning ships, and ships conveying oil in bulk, are prohibited from pumping out or cleaning out their tanks or bilges, within 3 miles seaward of the limits of the port.

(*vii*) No ship of 200 tons net register or upwards, shall enter Port Mombasa (*Lat. 4° 04′ S., Long. 39° 41′ E.*) on the flood tide, or leave it on the ebb tide, without first obtaining the written permission of the Port Management.

(*viii*) No ship, native vessel or small craft, shall anchor in the fairway of Port Mombasa that is to say, from the Customs landing place to any position 5 cables seaward of Ras Serani.

(*ix*) No ship, native vessel or small craft, shall anchor in the fairway of Port Kilindini, that is to say, eastward of an imaginary line drawn northward from the inner white leading mark, westward of Ras Mwa Kisenge to any position 5 cables seaward of Ras Serani.

Port Kilindini and Port Reitz.—Port Kilindini is a fine sheltered harbour, situated between the south-western side of Mombasa island and the mainland, the name Kilindini meaning " the deep place "; Port Reitz is a continuation westward of Port Kilindini. Port Kilindini affords good anchorage to all classes of vessels, in depths of from 11 to 15 fathoms (20^m1 to 27^m4), or vessels may secure alongside a quay, in depths of from 28 to 33 feet (8^m5 to 10^m1). Port Reitz affords equally good anchorage in its eastern part, in depths of from 7 to 15 fathoms (12^m8 to 27^m4), but, except in the channel leading to Duruma, *see* chart 1389, its western part is filled with shoals and flats.

Makupa creek, at the northern end of Port Kilindini, is entered between the north-western extreme of Mombasa island and Ras Mchangamwe, about 1½ cables westward; there is a depth of 29 feet (8^m8) in the entrance, within which there is a small area with depths of from 20 to 52 feet (6^m1 to 15^m8) the remainder of the creek being shallow.

Port Kilindini is entered between Ras Mwa Kisenge and Ras Mzimili, at the southern end of Mombasa island, about 3 cables northward; the banks on either side of the entrance are high and partly covered with trees and bushes.

From Ras Mwa Kisenge (*Lat. 4° 05′ S., Long. 39° 41′ E.*), the southern shore of the harbour trends west-north-westward for about 1½ miles to Ras Bofu, the eastern entrance point to Mueza creek, in which the depths are shoal; a flagstaff stands on Ras Bofu. From Ras Bofu, the western side of the harbour trends north-north-westward for about 1¾ miles to Ras Kigangone, the northern extreme of a peninsula which forms the southern entrance point to Port Reitz. There is a windsock near Ras Kigangone.

Charts 616, 1389, 664, 669, 597, 748b, 2483.

Chart 666.

From Ras Mzimili, the northern shore of the harbour lies nearly parallel with the southern shore as far as the entrance to Mbaraki creek, a shoal creek, about 7 cables west-north-westward; for about 3 cables south-eastward of the entrance to the creek, the shore has been reclaimed, and a wharf, consisting of jetties and pontoons, has been constructed.

Between the entrance to Mbaraki creek and Telegraph point, about half a mile north-westward, and thence to Ras Kilindini, the western extreme of a small promontory, about 5 cables farther north-westward, the northern shore of the harbour is somewhat indented, and there are a few shallow bights. Kilindini House, with a green roof, and Smith Mackenzie's Offices, with a flagstaff, about 1½ and 3¾ cables northward, respectively, of Telegraph point, are conspicuous. There are flagstaffs at the Yacht Club, about 3 cables south-eastward of Telegraph point, on Ras Liwotoni, about 2 cables south-south-eastward of Telegraph point, on Telegraph point and on Ras Kilindini; there is also a Naval base and a signal tower on Telegraph point.

A deep-water quay extends northward for about half a mile from close northward of Ras Kilindini, whence the shore trends north-north-westward for about 6 cables to Shimanzi, the north-western extreme of Mombasa island, and the eastern entrance point to Makupa creek. Ras Mchangamwe, the western entrance point to the creek, lies about 1½ cables westward of the extreme of Shimanzi, and forms also the northern entrance point to Port Reitz.

Dangers in Port Kilindini and approach.—A drying reef fringes the coast between Ras Serani and Ras Mzimili, and extends over one cable offshore in places.

The northern end of Andromache reef is fronted by shoal banks, with depths of 6 fathoms ($11^{m}0$) or less, which extend about 6½ cables north-eastward of Ras Mwa Kisenge, and contract the width of the entrance channel to about one cable in places.

Buchanan rock, a rock awash, lies about 2½ cables westward of Ras Bofu (*Lat. 4° 04′ S., Long. 39° 39′ E.*).

Kilindini reefs, three patches of drying reef, lie about 5 cables north-westward of Ras Bofu.

A bank, on which the depths are 6 fathoms ($11^{m}0$) or less extends as much as 3 cables offshore between Telegraph point and Ras Kilindini.

A shoal, with a least depth of 23 feet ($7^{m}0$), over it, lies on this bank about 2¾ cables westward of Telegraph point.

Depths of 6 fathoms ($11^{m}0$), or less, extend up to a distance of nearly 1¾ cables from the western side of the port between Ras Kigangone and a position about 5 cables southward.

Buoyage.—Lights.—Beacon.—The dangers in Port Kilindini and approach, and the fairway into and within the harbour, are marked as follows:—

A light-buoy painted in red and white chequers, and exhibiting a *red flashing* light *every two seconds*, is moored on the southern side of the channel about 3½ cables south-south-eastward of Ras Serani front leading light and marks the extremity of the shoals extending north-eastward of Ras Mwa Kisenge.

Leading lights are established westward of Ras Mwa Kisenge. The front light is exhibited at an elevation of 37 feet ($11^{m}3$) from a white stone obelisk 22 feet ($6^{m}7$) in height, situated on the coast

Charts 616, 1389, 664, 669, 597, 748b, 2483.

Chart 666.

about 3 cables westward of Ras Mwa Kisenge. The rear light is exhibited at an elevation of 52 feet ($15^{m}8$) from a similar obelisk about 2 cables west-south-westward of the front light-beacon. These lights in line, bearing 238°, lead in mid-channel through the entrance to Port Kilindini.

A light is exhibited, at an elevation of 16 feet ($4^{m}9$), from a white, stone beacon with a red vertical stripe, situated on the northern side of the channel about one cable eastward of Ras Mzimili.

A light is exhibited, at an elevation of 20 feet ($6^{m}1$), from a stone beacon painted in red and white chequers, about 1½ cables west-north-westward of Ras Mwa Kisenge.

A light is exhibited, at an elevation of 18 feet ($5^{m}5$), from a white, stone beacon, situated on the northern side of the channel at Mbuyuni, about 3 cables westward of Ras Mzimili.

Leading lights are established about 4 cables westward of Ras Kilindini (*Lat. 4° 04′ S., Long. 39° 39′ E.*) on the western side of the harbour. The front light is exhibited, at an elevation of 69 feet ($21^{m}0$), from a white stone pillar, 18 feet ($5^{m}5$) in height, situated about 4 cables westward of Ras Kilindini. The rear light is exhibited, at an elevation of 93 feet ($28^{m}3$), from a white stone obelisk, 49 feet ($14^{m}9$) in height, about 1½ cables north-westward of the front light. These lights in line, bearing 309°, lead in mid-channel between Kilindini reefs and the shoals extending offshore between Telegraph point and Ras Kilindini.

A light is exhibited from a white beacon, standing on Buchanan rock.

A light is exhibited from a white, stone beacon, marking the south-western end of Kilindini reefs.

A light is exhibited from a white, stone beacon, marking the north-eastern edge of Kilindini reefs.

A light is exhibited from a white, stone beacon, marking the north-western end of Kilindini reefs.

Leading lights are established at Ras Mchangamwe. The front light is exhibited, at an elevation of 39 feet ($11^{m}9$), from a white, stone beacon 15 feet ($4^{m}6$) in height, situated close within Ras Mchangamwe. The rear light is exhibited, at an elevation of 62 feet ($18^{m}9$) from a similar beacon about one cable north-north-westward of the front beacon. These lights in line, bearing 343°, lead in mid-channel from the line of the leading lights, situated about 4 cables westward of Ras Kilindini, to abreast the entrance to Port Reitz.

A light is exhibited, from a white stone beacon, surmounted by a pile structure, containing an automatic tide-gauge, about half a cable northward of Ras Kilindini.

A white, stone beacon, 15 feet ($4^{m}6$) in height and surmounted by a white diamond, marks a reef, which dries, about 1½ cables south-eastward of Ras Kilindini.

Two bollards stand close to the eastern side of the harbour about 2¾ and 4 cables south-eastward of Telegraph point.

A spherical buoy, painted in red and white horizontal bands and known as South Reef buoy, is moored about 1¼ cables west-north-westward of Buchanan rock light-beacon.

Wharves and jetties.—Mooring buoys.—A quay, with depths of from 28 to 33 feet ($8^{m}5$ to $10^{m}1$) alongside it, and having berths for five vessels, Nos. 1 to 5 from seaward, extends for about 2,900 feet

Charts 616, 1389, 664, 669, 597, 748b, 2483.

($883^{m}9$) along the shore from close northward of Ras Kilindini (*Lat. 4° 04′ S., Long. 39° 39′ E.*).

A quay, 1,288 feet ($392^{m}6$) in length, with a depth of 30 feet ($9^{m}1$) alongside it, in 1945, and having berths for two vessels, Nos. 7 and 8 from seaward, is situated close southward of Magadi jetty, *see* below.

A wharf, 500 feet ($152^{m}4$) in length, alongside which lighters can load or discharge cargo, is situated on the southern side of Ras Kilindini.

Magadi jetty, a **T**-shaped pier, having accommodation for one vessel and substantially built of concrete, projects from the shore about 8 cables northward of Ras Kilindini; it has a depth of 27 feet ($8^{m}2$) alongside; the depths increase rapidly westward of the jetty.

A jetty for berthing tankers and handling fuel oil cargoes, is situated at Shimanzi, about 2½ cables north-north-westward of Magadi jetty. It is 223 feet ($68^{m}0$) in length, with a depth alongside of 30 feet ($9^{m}1$).

Three jetties for accommodating lighters, are situated close south-eastward of the entrance to Mbaraki creek. Southward of these jetties are four additional small jetties for discharging coal from lighters.

Numerous mooring buoys, the positions of which can best be seen on the chart, are situated in various parts of the harbour.

Cables.—A submarine cable crosses the harbour between the front leading beacon westward of Ras Mwa Kisenge (*Lat. 4° 05′ S., Long. 39° 40′ E.*) and the opposite shore. Each end of the cable is marked by a hut and a notice board.

Two submarine cables are also laid across the entrance to Makupa creek. *See* page 435.

Overhead cables, with a clearance of 30 feet ($9^{m}1$) above mean high water springs between two telegraph poles, span the entrance to Makupa creek, about one cable north-north-eastward of Ras Mchangamwe.

Tidal streams.—For tidal streams in Port Kilindini and Port Reitz, *see* Table of Tidal Streams on chart 666.

The tidal streams set obliquely across the entrance channel, but within the entrance, they follow the direction of the channel; in the inner part of the harbour, between Ras Kilindini and Ras Kigangone, it is reported that various eddies exist at certain states of the tide.

Anchorages.—Prohibited anchorage.—That part of the harbour between Liwotoni bay and Ras Kilindini is principally used for anchorage by large vessels.

Anchorage is prohibited south-eastward of the pecked line on the chart drawn from Ras Bofu to the opposite shore; *see* also page 435.

Northward of Ras Kilindini, the harbour is kept clear for the manœuvring of vessels going alongside the deep-water quay, Magadi jetty and the jetty at Shimanzi.

Vessels exempt from compulsory pilotage are allotted special anchorage berths.

Anchorage may be obtained in Port Reitz, in depths of from 12 to 15 fathoms ($21^{m}9$ to $27^{m}4$), mud, with Ras Kigangone bearing 115°, distant 4 cables.

Port Reitz.—Beacons.—Buoyage.—A pair of beacons, about half a cable apart, stand about a cable northward of Magadi jetty; each consists of a white wooden rectangular structure, the rear beacon having a pointed top; the beacons in line, bearing 072°, mark the

Chart 666.

southern limit of the deep-draught anchorage at the eastern end of Port Reitz.

An iron tripod beacon, 12 feet ($3^{m}7$) high and surmounted by a red St. Andrew's cross, stands on the southern extremity of a stony spit extending about 1½ cables southward from Ras Mkadini.

The chimney of a brickworks and a white hotel with a flagstaff are situated about 5¾ and 7½ cables west-north-westward, respectively, of Ras Mkadini; an iron and concrete pier extends about 400 feet ($121^{m}9$) from the northern shore abreast of the hotel and, in 1942, there was a depth of 3 feet ($0^{m}9$) at its head.

A white, wooden, framework beacon, surmounted by a disc, stands, at an elevation of 76 feet ($23^{m}2$), on the southern shore about 2¼ miles west-south-westward of Ras Kigangone.

The fairway through Port Reitz is marked on the northern side by No. 1 red conical buoy, and Nos. 3 and 5 spherical buoys with topmarks, moored about 2½ cables east-south-eastward, and nearly 7 and 11 cables west-south-westward, respectively, of Ras Mkadini. The southern side of the fairway is marked by Nos. 2 and 4 buoys, moored about half a cable northward and 1¼ miles west-south-westward of Ras Kigangone; No. 2 buoy is spherical and painted in red and white vertical stripes, and No. 4 buoy is a black and white chequered can buoy.

Charts 666, 616.

Power vessels.—Vessels approaching from southward should give Andromache reef a berth of at least one mile, and should steer for the outer edge of Leven reefs until the leading beacons on Ras Serani are in line, bearing 301°, when they should be steered for on that bearing; the leading beacons are not easily distinguished during the afternoon.

Vessels approaching from northward should steer to pass about one mile eastward of Leven reefs, and should continue on a southerly course until the leading beacons at Ras Serani are in line, bearing 301°, when they should be steered for on that bearing. If unable to distinguish the leading beacons, vessels should continue southward until the conspicuous grey dome, close west-north-westward of the cathedral bears 306°, when it may be steered for on that bearing, until on the line of the leading beacons.

Vessels of deep draught, wishing to avoid depths of less than 6 fathoms ($11^{m}0$) may, from a position about 2½ miles south-eastward of Ras Serani, steer to bring Mackenzie point into line with the north-eastern corner of the conspicuous school about 9 cables north-north-westward of it, bearing 329°, and keep it so until Ras Serani leading light-structures are in line, but vessels must keep close to this line to avoid the 32- and 34-foot ($9^{m}8$ and $10^{m}4$) patches on either side about 14 and 15 cables, respectively, south-eastward of Ras Serani front leading light."

Chart 666.

Directions for vessels entering Port Mombasa are given on page 442.

The tidal streams meet off Ras Serani and great attention to steering is therefore necessary. When about a quarter of a mile from Ras Serani front leading beacon, vessels entering Port Kilindini should alter course westward to bring the leading beacons westward of Ras Mwa Kisenge (*Lat. 4° 05′ S., Long. 39° 41′ E.*) in line bearing

Charts 1389, 664, 669, 597, 748b, 2483.

Chart 666.

238°. Great care is necessary to keep on this line, as the tidal streams set obliquely across the entrance to Kilindini harbour, and as the leading beacons are rather close together, the alignment is not very sensitive.

When abreast Ras Mwa Kisenge, Ras Bofu will be observed to open south-south-westward of the light-beacon at Mbuyuni, and a mid-channel course may then be steered until the second pair of leading beacons, situated on the mainland opposite Ras Kilindini, are in line, bearing 309°, when they should be steered for on that bearing, which leads north-eastward of Buchanan rock and Kilindini reefs, and south-westward of the shoals extending offshore between Telegraph point and Ras Kilindini. Care is also necessary when steering on these marks, as they are close together and the alignment is, therefore, not sensitive.

If anchoring in Port Reitz, when south-westward of Ras Kilindini, course should be altered northward to bring the leading beacons at Ras Mchangamwe in line, bearing 343°, and vessels should keep on this line until abreast Ras Kigangone, when course may be shaped to round the latter point, and anchorage obtained as convenient.

As a general rule, vessels making the port late at night are advised to stand off until daylight. During the months of May to September, the period of the south-west monsoon, the sea and swell which prevail in the main channel, frequently make difficult the boarding and disembarking of pilots, and entry of vessels during the night, must necessarily be very limited during this period. Also, on account of the strength of the tidal streams, vessels do not usually enter the port during the hours of darkness, at springs.

Port facilities.—The deep water quay is served by the railway which also serves the lighter wharf on the southern side of Ras Kilindini and the jetties south-eastward of Mbaraki creek.

There are numerous electric cranes on the deep water quay, steam and hand cranes on the lighter wharf, and electric transporters on the jetties south-eastward of Mbaraki creek.

There are two tugs and there are several lighters at the port.

Supplies.—Large stocks of coal are maintained. Coal is taken in from lighters in tubs or baskets, at a rate of about 400 tons in 24 hours.

Large stocks of fuel oil are maintained. Oil is taken in by pipe line alongside the deep water quay at a rate of approximately 300 tons per hour; oil may also be taken in alongside Magadi jetty or the oil jetty at Shimanzi (*Lat. 4° 03′ S., Long. 39° 38′ E.*).

A large supply of Diesel oil is available.

Fresh provisions are plentiful; water is laid on to the deep water quay and to the oil jetty at Shimanzi.

Repairs.—Large repairs can be undertaken. A slipway, which will accommodate vessels up to 2,350 tons deadweight, is situated on the northern shore of Mbaraki creek. For details, *see* Appendix II.

Piers.—**Lights.**—A pier, which is privately owned, is situated about 4 cables south-eastward of Ras Kilindini.

There is a small pier on the mainland opposite Ras Kilindini, at the southern end of the Admiralty ground.

A light is exhibited, from each end of the landing pontoon at Ras Kilindini.

Charts 616, 1389, 664, 669, 597, 748b, 2483.

Chart 666.

Port Mombasa.—Danger in approach.—Light-buoy.—Port Mombasa is situated between the eastern side of Mombasa island and the mainland, and, although of ample depth, the anchorage space is narrow and congested.

The port is entered between Ras Serani (*Lat. 4° 04′ S., Long. 39° 41′ E.*) and Mackenzie point, about 5 cables north-north-eastward, but the entrance channel is contracted by a bank, on which the depths are less than 3 fathoms ($5^{m}5$), the inner part of which dries, which fronts the coast between Mackenzie point and George rock, and extends over 5 cables southward of the former point.

A conical light-buoy painted black with a conical topmark and exhibiting a *green flashing* light *every two seconds*, is moored about 6½ cables southward of Mackenzie point and about a cable southward of the southern end of the above bank.

From Ras Serani, for about 7 cables northward to a small point abreast the town of Old Mombasa on which is the Custom House, the western side of Port Mombasa is cliffy and is fringed with a narrow reef, which nowhere extends more than half a cable offshore; foul ground, which should be avoided, extends about half a cable eastward of the Custom House.

Between the Custom House and Ras Kiberamini, about 8 cables farther northward, is a bay which is nearly filled with a drying sandbank. On this sandbank are two small reefs, which dry 11 feet ($3^{m}4$); a number of fishing stakes extend across the sandbank to the low-water line. Northward of the town, which extends about 2½ cables along the southern shore of the bay, the shore is thickly covered with coconut palms. Nyali bridge, a pontoon road bridge, spans the harbour from Ras Kiberamini to the mainland opposite; there is a maximum clearance of 31 feet ($9^{m}4$) under the bridge.

The points on the eastern side of Port Mombasa are moderately steep-to. The bank extending southward of Mackenzie point, passes about one cable westward of it, and thence approaches the shore. Ras Kidomoni, a projection, 10 feet ($3^{m}0$) high, rapidly rising within to 40 feet ($12^{m}2$) high, lies about 5 cables north-north-westward of Mackenzie point, whence the eastern side of the port trends northward for about 4 cables to the eastern end of Nyali bridge. Above the bridge, the head of the port terminates in a bay, the northern side of which is formed by the promontory of Ras Kisaoni, the western extreme of which, lies about 3 cables north-westward of Ras Kiberamini (*Lat. 4° 03′ S., Long. 39° 41′ E.*).

Leading beacons.—Lights.—Leading beacons are established at the head of Port Mombasa. The front beacon is a pillar, painted in black and white horizontal bands, situated on Ras Kiberamini. The rear beacon is a white, stone beacon, 35 feet ($10^{m}7$) in height, situated on the shore, eastward of Ras Kisaoni, about 2½ cables north-north-westward of the front beacon. These beacons in line, bearing 346°, lead from the main channel into Port Mombasa.

Lights are exhibited from the above beacons, when a vessel is entering or leaving Port Mombasa at night.

Tidal streams.—Anchorage.—Both in-going and out-going tidal streams attain a velocity of from 2½ to 3 knots at springs, and have about an equal duration.

The holding ground is good, but as the tidal streams are strong,

Charts 616, 1389, 664, 669, 597, 748b, 2483.

Chart 666.

vessels swing broadside to them during fresh winds, which occasionally causes heavy jerks on the cable. Vessels should always moor.

A good berth is close westward of the line of the leading beacons, in a depth of 10 fathoms (18^m3), sand and shells, with Ras Kidomoni (*Lat. 4° 03′ S., Long. 39° 41′ E.*) bearing 038°, distant about one cable.

Directions.—Vessels entering Port Mombasa should follow the directions given on page 439, until within about 4 cables of Ras Serani front leading beacon, when course should be altered northward to bring the beacons, situated on Ras Kiberamini and Ras Kisaoni, in line, bearing 346°, which line leads into Port Mombasa.

Care must be taken to alter course in good time to get on this line, and great attention must be paid to steering, especially during the strength of the out-going tidal stream, as the tide will take vessels first on one bow and then on the other.

Large vessels should enter at high water, or during the first of the out-going tidal stream, and strangers should always enter with the out-going tidal stream against them.

On account of a projection in the fringing reef, close southward of Ras Mitani about 4 cables northward of Ras Serani, vessels should keep slightly eastward of the line of the leading beacons when nearing that position, and should also do the same, when nearing the Custom House, in order to avoid the foul ground eastward of it; during the period of the in-going tidal stream, there is a decided set towards the Custom House, and, at times, there is a small tidal race over the foul ground.

Pier.—Light.—A light is occasionally exhibited from a landing pier about half a cable north-north-westward of the Custom House.

Town.—The town of Mombasa (Mvita) is the most important on this part of the coast, and is the headquarters of the coastal area of Kenya Colony and Protectorate. The Provincial Commissioner, Coast, has his headquarters at Mombasa.

The administration is in the hands of a Municipal Board under the chairmanship of the Resident Commissioner, who resides at Government House situated on the coast between Ras Serani and Ras Mitani. There are numerous government offices and residences, but the town itself consists of narrow and irregular streets and houses.

The climate is less enervating than that of Zanzibar, and improved sanitation and cultivation of the surrounding country, would make Mombasa one of the healthiest places in the tropics.

There is a Government hospital and a small private nursing home, both for Europeans; there is also a hospital for natives and one for infectious cases.

There is a seamen's institute at Port Kilindini (*Lat. 4° 04′ S., Long. 39° 39′ E.*).

In 1948 the estimated population of the municipal area of Mombasa was 84,750 of which 2,027 were Europeans.

During the year 1949, 911 power vessels with a total net tonnage of 2,649,851 tons, visited the port of Mombasa.

Communications.—There is regular communication by sea with Europe, South Africa and India.

The port of Mombasa is the seaward terminus of the Kenya and Uganda railway.

There is a bus service between Old Mombasa and Port Kilindini.

Charts 616, 1389, 664, 669, 597, 748b, 2483.

Chart 666.

The town is connected to the general telegraph system.

There is a regular air service with Europe, South Africa and other East African ports.

There is a radio station at Mombasa, *see* page **35.**

Climatic table.—*See* page 79.

Charts 666, 616.

Port Tudor.—Beacon.—Port Tudor is a landlocked harbour, situated on the northern side of Mombasa island. It is approached through a narrow winding, but deep channel, which is entered at the head of Port Mombasa, between Ras Kiberamini and Ras Kisaoni, but it is available only to boats and to small craft which can pass under Nyali bridge.

The banks of the channel leading to Port Tudor are fringed with reefs, which extend as much as half a cable offshore in places, and the northern end of Mombasa island, which forms the southern side of Port Tudor, is fronted with reef and foul ground, which extends about 1½ cables offshore.

A white beacon, surmounted by a ball, stands about 9 cables north-north-westward of Ras Kisaoni, and marks the north-eastern part of the foul ground extending northward of Mombasa island.

The northern and western parts of Port Tudor are encumbered with shoals, through which there are several channels, one of which leads to Mto Jomvu and may be ascended for several miles at high water. Rabai mission station is situated near the head of Mto Jomvu.

Chart 1389.

RAS IWATINE TO RAS NGOMENI.—Ras Iwatine to Ras Kitoka.—Aspect.—Northward of the entrance to the port of Mombasa, the Rabai range runs nearly parallel with the coast for about 10 miles, at about 9 miles inland; it has five distinct summits, of which the northernmost, Jibana, 1,023 feet ($311^{m}8$) high, is the highest, and lies about 11 miles north-north-westward of Ras Iwatine. Kambe, a peak about 1½ miles south-westward of Jibana, has a clearly defined dome-shaped summit, and is very noticeable. Near Rabai hill, the southernmost peak in this range, about 9 miles south-westward of Jibana, is the town and mission station of Rabai.

Charts 616, 1389.

Between the Rabai range and the coast, the country is undulating and wooded.

The Senawe range forms a continuation northward of the Rabai range, being separated from the latter by a low hill. Simba (Chogni), 1,154 feet ($351^{m}7$) high, the southern peak of the Senawe range, about 5 miles northward of Jibana, had, in 1888, a conspicuous group of tall palms on its summit.

Between Simba and Kauma, a peak about 3 miles farther northward, is a gap, known as Kilifi gap (*Lat. 3° 42′ S., Long. 39° 42′ E.*).

A coastal range, between 400 and 500 feet ($121^{m}9$ and $152^{m}4$) high, commences about 7 miles northward of Nguu Tatu, described on page 430, there being thickly wooded country between it and the coast. At the southern end of this range, are two peaks, on the southern of which there was, in 1888, a conspicuous clump of trees, and there was another clump of trees on a hill about 3½ miles farther north-eastward.

Charts 664, 669, 597, 748b, 2483.

Charts 616, 1389.

The coastal range ends at Blowing point (*Lat. 3° 42′ S., Long. 39° 52′ E.*), about 21 miles north-north-eastward of Ras Iwatine whence a plain extends for about 3 miles farther northward to the entrance to Mto Kilifi. Mbogolo rises from this plain, about 2½ miles westward of Blowing point; it is quoin-shaped, with its fall facing northward.

Coast.—Mto Mtwapa.—Between Ras Iwatine, described on page 431, and Blowing point, about 21 miles north-north-eastward, the coast consists of sandy beaches, with low, overhanging, coral cliffs, and, for about the first 16 miles of this stretch, is fronted by a barrier reef, which extends from 5 to 7 cables offshore; there is a canoe passage inside the barrier reef.

The barrier reef is broken at the entrance to Mtwapa creek (Matawapa river) about 4 miles north-north-eastward of Ras Iwatine, that part southward of the entrance, being a continuation of Leven reefs, which are described on page 431.

In 1942, the least depth obtained in the fairway of the passage through the reef and in the river entrance was 19 feet ($5^{m}8$), above which there are greater depths but the channel is rather intricate; vessels of a draught of 11 feet ($3^{m}4$) have entered the river. In 1896, boats from H.M.S. *Swallow* ascended the river for about 6 miles above the entrance; an overhead telegraph cable crosses the river about 2 miles within the entrance at which point there is a ferry.

The barrier reef ceases about 5 miles southward of Blowing point, and the coast is steep-to, with low, overhanging cliffs to within a mile southward of the point; a prominent white sand patch is situated on top of these cliffs, about 2 miles southward of Blowing point.

The outer edge of the barrier reef is steep-to, and there are no known off-lying dangers between Ras Iwatine and Blowing point.

Current.—At about 10 miles from the coast, the current sets constantly north-north-eastward at rates of from 2 to 4 knots during the south-west monsoon, and from one to 2 knots during the north-east monsoon; closer inshore, the strength of the current decreases.

Chart 238, Kilifi river and approaches.

Coast.—Light.—Between Blowing point and the entrance to Takaungu creek, about 1¼ miles northward, and thence about 2¼ miles farther northward to Ras Kitoka, the southern entrance point to Mto Kilifi, the coast is formed of cliffs, from 40 to 60 feet ($12^{m}2$ to $18^{m}3$) high, and is backed by bush and scrub. This stretch of coast is rock-bound and fringed with reefs, which, at its southern part, extend as much as 2½ cables offshore. There is a light-coloured sandy beach close southward of the entrance to Takaungu creek, which assists to identify the entrance, and there are two small sand beaches close northward of the entrance.

A light is exhibited, at an elevation of 130 feet ($39^{m}6$), from a white, framework, iron tower, with a white day-mark, 25 feet ($7^{m}6$) in height, situated close northward of the entrance to Mto Kilifi, about 6 cables north-north-eastward of Ras Kitoka.

Dangers in approach to Mto Kilifi.—Between Blowing point and a position nearly 2 miles northward of the entrance to Mto Kilifi, the coast is fronted by South, Middle and North reefs, a chain of detached reefs, with channels between them, which lies about one mile from the coast. These reefs do not dry, but a few rocks are occasionally visible

Charts 664, 597, 748b, 2483.

Chart 238, Kilifi river and approaches.

at low water on Middle reef. During the north-east monsoon, they are not nearly so prominent as during the south-west monsoon, when they always break; during and after gales, they sometimes break to such an extent that the channels between them are not distinguishable.

Within the off-lying reefs, the northern entrance point to Mto Kilifi is fronted by a series of reefs, which extend south-eastward and leave only a narrow entrance channel into the river, which passes close to the coast lying southward of Ras Kitoka (*Lat. 3° 39′ S., Long. 39° 52′ E.*).

Passes.—Leading marks and beacons.—There are three passes through the off-lying reefs, by which Takaungu creek or Mto Kilifi may be approached. Dhow channel, the southernmost pass, lies between Blowing point and the southern end of South reef; it is encumbered with shoals, and is used only by dhows and light draught vessels with local knowledge.

Takaungu pass, lying between South and Middle reefs, has a width of about 1½ cables in a channel in which the depths are more than 10 fathoms ($18^{m}3$).

The summit of Mbogolo, described on page 444, in line with a bluff point on the southern bank of Takaungu creek, close within the entrance, bearing 246°, leads in mid-channel through Takaungu pass. *See* view A on chart 238.

North pass, between Middle and North reefs, is the most direct approach to the entrance to Mto Kilifi, but the channel in which the depths are more than 5 fathoms ($9^{m}1$), is only about one cable wide, and there is a 5-fathom ($9^{m}1$) patch, close southward of mid-channel.

Chart 238, Kilifi river entrance.

A beacon, consisting of a pillar, 14 feet ($4^{m}3$) in height, stands at an elevation of 44 feet ($13^{m}4$) on the coast about 8 cables south-south-eastward of Ras Kitoka; a similar beacon is situated about 1½ cables westward of the front beacon.

These beacons, in line bearing 273°, lead in mid-channel through North pass. *See* View B on chart 238.

A beacon, consisting of a stone pillar, 15 feet ($4^{m}6$) in height, with an elevation of 70 feet ($21^{m}3$), is situated in front of the village of Kioni, on the northern bank of Mto Kilifi, about 4 cables northward of Ras Kitoka. A white, stone, beacon with a lower elevation, is situated about half a cable south-south-eastward of the rear beacon. These beacons in line, bearing 329°, lead from the roadstead within the off-lying reefs, to the entrance to Mto Kilifi.

Chart 238, Kilifi river and approaches.

Takaungu creek.—Anchorage.—Takaungu creek is entered between Pinnacle point, a rocky bluff, about 1¼ miles northward of Blowing point, and a similar point about 2½ cables southward, but the entrance is nearly filled with drying banks, which leave only a narrow channel which passes close to the northern bank. Within the entrance, the creek trends westward for about 1¼ miles when it ends in mangrove swamps. It is navigable by dhows at or near high water, but the tidal streams are strong and run with considerable disturbance in the outer part of the creek. The bed of the entrance channel is rocky, with several sunken coral patches, and, in 1888, a small steam-boat from H.M.S. *Stork* was only able to enter with difficulty.

The town of Takaungu (*Lat. 3° 41′ S., Long. 39° 52′ E.*) is situated

Chart 238, Kilifi river and approaches.

in a grove of coconut palms on the southern bank, about half a mile within the entrance. There is a fort with a flagstaff on the northern side of the town, and south-eastward of the fort is the District Officer's house, which, being whitewashed, is visible between the entrance points for a considerable distance east-north-eastward.

There are several mosques in the town, which contains a large number of houses and huts, but the population is variable ; a causeway carrying a road, is built across Takaungu creek.

Fresh provisions are obtainable, eggs and vegetables being abundant ; there are numerous wells.

Anchorage may be obtained off Takaungu creek, in a depth of about 6½ fathoms (11^{m}9), sand, with Pinnacle point (*Lat. 3° 41′ S., Long. 39° 52′ E.*) bearing 238°, distant about 6½ cables.

Chart 238, Kilifi river entrance.

Mto Kilifi.—Depths.—Mto Kilifi is entered between Ras Kitoka, a bluff, 57 feet (17^{m}4) high, and a similar bluff, about 3 cables north-north-eastward ; the land close within the northern entrance point rises gradually to an elevation of over 100 feet (30^{m}5). Between Ras Kitoka and Ras Nkoma, a projection on the southern bank, about 1½ miles west-north-westward, the river runs between cliffs, from 70 to 100 feet (21^{m}3 to 30^{m}5) high, fringed by narrow reefs, the latter extending only a short distance offshore, except at the entrance, where at Ras Kitoka and for about 4 cables within the northern entrance point, the reefs extend about one cable offshore.

Westward of Ras Nkoma, the river expands into Bandaria ya Wali, a wide basin, the shores of which rise gradually on all sides and are lined with mangroves. Except close north-westward of Ras Nkoma, the depths in Bandaria ya Wali are very shoal, and its northern and western parts are nearly filled with drying mudbanks. In the north-western corner of the basin, is the entrance to Mto Mtanganyiko or Konjoro, a narrow river with depths of one foot (0^{m}3) at its entrance ; within the entrance, the depths slightly increase. About 2 miles above the entrance, the river divides into two branches, one leading northward about one mile to the village of Konjoro, and the other to Mtanganyiko, a similar distance westward of the fork. The river is tidal as far as these villages, which are grain-growing centres.

There is a least depth of 6 fathoms (11^{m}0) in the fairway between either Takaungu or North pass and the entrance to Mto Kilifi. Within the entrance, there are depths of from 15 to 20 fathoms (27^{m}4 to 36^{m}6) in mid-channel between Ras Kitoka and Ras Nkoma, but the entry of large vessels is not advised as the channel is winding, and, in places, not more than one cable wide.

Port limits.—The limits of the port of Kilifi comprise the area contained within the arc of a circle described from Ras Kitoka with a radius of 3 miles, including Mto Kilifi and Takaungu creeks.

Cable.—Ferry.—An overhead telegraph cable spans the river, close north-westward of the village of Mnarani (*Lat. 3° 38′ S., Long. 39° 51′ E.*), about 1¼ miles within the entrance ; it has a least clearance of 68 feet (20^{m}7), and, close to the northern shore, there is a clearance of over 80 feet (24^{m}4).

A chain pontoon ferry crosses the river close eastward of the telegraph cable. Vessels of a draught of not more than 9 feet (2^{m}7) can pass over the chain, which is buoyed, but should pass midway between two

Charts 1389, 664, 597, 748b, 2483.

Chart 238, Kilifi river entrance.

buoys. Vessels of deeper draught may not proceed above the ferry without permission from the Port Authorities at Mombasa.

Chart 238, Kilifi river and approaches.

Tidal streams.—The tidal streams set directly across the passes through the off-lying reefs, the tidal stream of the rising tide setting northward, and that of the falling tide, southward.

Chart 238, Kilifi river entrance.

The tidal streams set obliquely across the entrance to Mto Kilifi. Within the entrance, the tidal streams run at rates of from three-quarters of a knot to 1½ knots.

Chart 238, Kilifi river and approaches.

Anchorages.—Anchorage may be obtained off the entrance to Mto Kilifi, close northward of the line of the leading beacons for North pass, with the front leading beacon bearing 263°, distant about 5 cables; there is always a ground swell at this anchorage.

Chart 238, Kilifi river entrance.

Vessels that can pass over the ferry chain and under the telegraph cable, may obtain good anchorage, in a depth of 12 fathoms ($21^{m}9$), mud, with a point on the northern bank, south-westward of the village of Kioni (*Lat. 3° 38′ S., Long. 39° 52′ E.*), bearing 095°, and the western cliff of a valley, westward of Mnarani, bearing 160°. Vessels unable to proceed above the ferry, may obtain anchorage in mid-channel, from one to 2 cables eastward of the ferry, in depths of from 15 to 20 fathoms ($27^{m}4$ to $36^{m}6$).

Good anchorage may be obtained in Bandaria ya Wali, in a depth of 9 fathoms ($16^{m}5$), mud, with Ras Nkoma bearing 126°, distant about 3½ cables.

Chart 238, Kilifi river and approaches.

Directions.—Vessels entering Takaungu pass should bring the summit of Mbogolo in line with a bluff point on the southern bank of Takaungu creek, bearing 246°, *see* view A on chart 238, and should keep on this mark until the rear leading beacon at Kioni is well open westward of the front beacon, when course may be shaped for the anchorage north-eastward of the entrance to Takaungu creek, or for the northern part of the roadstead.

Vessels entering North pass should bring the leading beacons, situated about 8 cables southward of Ras Kitoka, in line, bearing 273°, *see* view B on chart 238, and should keep on this mark until within about half a mile of the front beacon, when course may be shaped for the anchorage.

Chart 238, Kilifi river entrance.

If proceeding into Mto Kilifi, having passed the outer reefs as directed above, vessels of light draught should bring the leading beacons at Kioni in line, bearing 329°, and should keep on this mark until abreast Ras Kitoka. Deep draught vessels, however, when northward of the line of the leading beacons for North pass, should keep slightly westward of the line of the Kioni leading beacons until within about 4 cables of Ras Kitoka, and then slightly eastward of the line, in order to give a wider berth to the reefs. When the extreme of Ras Nkoma is in line with a point on the opposite bank, east-south-eastward of it bearing 288°, a mid-channel course may be shaped, slightly opening, Ras Nkoma after rounding Ras Kitoka, in order to avoid the reef off the point south-westward of Kioni.

Charts 1389, 664, 597, 748b, 2483.

Chart 238, Kilifi river and approaches.

Villages.—Fresh provisions may be obtained at Mnarani, the principal village, situated on a tableland on the southern side of Mto Kilifi. The ruins of mosques on the site of the old town of Kilifi, may be seen about 1½ cables westward of Mnarani. The present village of Kilifi lies close westward of Ras Kitoka, and the large village of Kibokoni lies on the northern side of Bandaria ya Wali, at the entrance to Mto Mtanganyiko.

Chart 1389.

Coast.—Between the entrance to Mto Kilifi and the entrance to Mida creek (Owyombo river), about 16 miles north-north-eastward, the coast is similar in appearance to that farther southward, and consists of sandy beaches and low, overhanging, coral cliffs, backed with thick scrub and bushes, from 15 to 20 feet ($4^{m}6$ to $6^{m}1$) high, and fringed with a coral reef, which extends from 5 to 7½ cables offshore. About 10 miles north-north-eastward of Kilifi lighthouse (*Lat. 3° 38′ S., Long. 39° 52′ E.*), there is a sand patch which, in 1892, had a high clump of casuarina trees over it, and was noticeable both from northward and southward; close southward of this clump, are some red sand cliffs and just southward of the sand cliffs is the village of Wasa.

A distinctive white sandhill, 25 feet ($7^{m}6$) high, is situated on the coast, about 8 cables southward of the entrance to Mida creek, and there is a conspicuous hummock, 131 feet ($39^{m}9$) high, with a steep southern side, about a mile northward of the sandhill. An islet, 45 feet ($13^{m}7$) high, lies in the centre of the entrance to the river, and on the southern entrance point are patches of red sand cliffs.

Dhows anchor within the islet, but the river is only navigable for canoes.

About 6 miles within this stretch of coast is a flat range of hills, from 600 to 800 feet ($182^{m}9$ to $243^{m}8$) high, but without any well-defined summits.

Mount Mangea, an isolated, well-defined peak, 1,702 feet ($518^{m}8$) high, with gradually sloping sides, lies about 17 miles west-north-westward of the entrance to Mida creek, and, in clear weather, makes a good landmark.

Between the entrance to Mida creek and Malindi point, about 11 miles north-eastward, the coast is thickly wooded and fronted by a coral reef, which, southward of Malindi point, extends as much as 1½ miles offshore.

Chart 667.

Port of Malindi and approaches.—Lights.—Beacons.—From Malindi point, the coast trends northward for about 4 miles to the town of Malindi. Malindi point is a rounded, coral cliff, 20 feet ($6^{m}1$) high, made prominent by Sail rock, a detached rock, 21 feet ($6^{m}4$) high, close eastward of it. Malindi point and the coast for about 3 miles south-westward, are fronted by Malindi reef, which extends about 1½ miles offshore, dries in patches and generally breaks. There is a passage within Malindi reef which is used by small dhows.

Between Malindi point and Leopard point, a white sandy point which had, in 1892, a conspicuous clump of casuarina trees on it, about 2¼ miles north-north-eastward, the coast consists of cliffs, from 15 to 20 feet ($4^{m}6$ to $6^{m}1$) high, covered with low scrub and bush, and fringed with a reef which dries in places and extends as much

Charts 664, 848, 597, 748b, 2483.

Chart 667.

as 4 cables offshore; a detached rock, 12 feet ($3^{m}7$) high, stands on the coastal reef, about 5 cables southward of Leopard point.

Between Leopard point and a cliffy point nearly 2 miles northward, there is a long stretch of sandy beach; Vasco da Gama's pillar, a white masonry column, 18 feet ($5^{m}5$) in height, surmounted by a cross, stands near the extreme of the cliffy point, at an elevation of 25 feet ($7^{m}6$). Pillar reef, which extends about 5 cables offshore and dries in places, fringes the coast from about 5 cables northward of Leopard point to about the same distance northward of Vasco da Gama's pillar. In 1923, the wreck of a small steam vessel lay stranded on the north-eastern extreme of Pillar reef, and was visible at all states of the tide.

A light is exhibited, at an elevation of 83 feet ($25^{m}3$), from a white framework tower 44 feet ($13^{m}4$) in height, situated about 1½ cables south-south-westward of Vasco da Gama's pillar (*Lat. 3° 13′ S., Long. 40° 08′ E.*).

A light is exhibited, at an elevation of 18 feet ($5^{m}5$) from a white concrete beacon 29 feet ($8^{m}8$) in height, situated on the northern side of Pillar reef, about 6 cables northward of Vasco da Gama's pillar.

Leading lights are established at Malindi. The front light is exhibited from a red beacon with a white vertical stripe, about 5 cables north-westward of Vasco da Gama's pillar. The rear light is exhibited from a similar beacon about 200 feet ($61^{m}0$) south-south-westward of the front beacon. These lights in line, bearing 213°, lead into Malindi Bay anchorage.

Between Vasco da Gama's pillar and the entrance to Mto Sabaki, about 3½ miles northward, the coast forms a bight, at the head of which is a sandy beach, backed by sandhills about 50 feet ($15^{m}2$) high. The town of Malindi is situated on the south-western shore of the bight; prominent buildings in the town are the Custom House, a low building with a red roof, about 5 cables north-westward of Vasco da Gama's pillar, and a small fort with a flagstaff, situated close to the Custom House, while a bungalow with a red roof, situated about 5½ cables farther north-westward, is conspicuous.

Chart 1389.

Within the coast, Gaji hill, 382 feet ($116^{m}4$) high, a wooded quoin-shaped hill, about 8 miles westward of Vasco da Gama's pillar, is distinctive from eastward.

Chart 667.

The entrance to Mto Sabaki dries, and the depths in the river are shoal and it is only navigable by small canoes; there is a guard house on either bank of the river, situated about 3 cables northward of the entrance.

Northward of Mto Sabaki, the land rises, and a coastal range extends about 2¾ miles north-north-eastward to Mambrui point; a white sandhill, 145 feet ($44^{m}2$) high, stands near the southern end of this range, about one mile north-north-eastward of the entrance to the river and is conspicuous from seaward. A white surveying beacon stands on the summit of the sandhill.

Mambrui point is fringed by a reef which extends about one mile offshore; the village of Mambrui, in the centre of which there was, in 1889, a prominent white house and a tree, is situated about 8 cables northward of Mambrui point. The village is remarkable for a curious, leaning pillar, about 20 feet ($6^{m}1$) in height, the origin of which is unknown.

Charts 664, 848, 597, 748b, 2483.

Chart 1389.

Single Tree hill, a round-topped hill, 563 feet (171^{m}6) high, with a conspicuous single tree on its summit, is situated about 7 miles north-westward of Mambrui point.

Port limits.—The limits of the port of Malindi comprise the area contained within the arc of a circle described from Malindi lighthouse with a radius of 3 miles.

Chart 667.

Dangers in approach.—Leopard reef, which dries in places, lies about 2 miles eastward of Leopard point; on the western edge of the drying part of the reef, is a sandbank which is awash at high water.

A coral reef, awash, lies off the western side of Leopard reef, about one mile south-eastward of Leopard point.

Malindi bank, on which the depths are from 3 to 5 fathoms (5^{m}5 to 9^{m}1), extends about 3 miles southward of Leopard reef. Its eastern edge is steep-to, but the depths increase gradually for about 2 miles southward of the bank; there are, apparently, no shoal patches, and the sea-bed, sand and coral, may easily be seen in depths of 8 fathoms (14^{m}6). There are heavy tide rips and overfalls off the south-eastern end of the bank.

Griffon patches are several patches, with depths of from 2¼ to 5 fathoms (4^{m}1 to 9^{m}1), which are situated eastward and north-eastward of Leopard reef, about 2½ miles eastward of Leopard point.

North reef (*Lat. 3° 15′ S., Long. 40° 09′ E.*), which lies about one mile eastward of Leopard point, has on it a sandbank, which dries 10 feet (3^{m}0).

The outer edges of Pillar reef are fringed with shoals, on which the depths are less than 3 fathoms (5^{m}5), which extend more than 3 cables eastward of the reef.

A one-fathom (1^{m}8) patch, which breaks at low water in any swell, lies about 1½ miles northward of Vasco da Gama's pillar, and patches, with depths of 3 and 4 fathoms (5^{m}5 and 7^{m}3), lie about one mile offshore, south-eastward and eastward, respectively, of the mouth of Mto Sabaki.

Malindi road.—Malindi road lies off the coast southward of Leopard point, and is sheltered from northward and eastward by North reef and Leopard reef. It is entered from southward by a channel which passes over Malindi bank, with a least depth of 3¼ fathoms (5^{m}9), and from northward by Stork passage, which lies between Leopard and North reefs, and has a least depth of 5½ fathoms (10^{m}1).

Current.—Off Malindi, outside the reefs but within depths of 100 fathoms (182^{m}9), a nearly constant current, setting southward at a rate of three-quarters of a knot, was experienced during the months of November and December. In depths of more than 100 fathoms (182^{m}9), however, the current sets constantly northward, with a rate of one knot during the north-east monsoon, and of 3 knots during the south-west monsoon.

Anchorages.—Anchorage may be obtained in Malindi road, in a depth of 6½ fathoms (11^{m}9), sand and coral, with Sail rock bearing 220° and open eastward of Malindi point, and the clump of trees on Leopard point, bearing 318°.

Anchorage may be obtained off the town of Malindi, in a depth of about 5 fathoms (9^{m}1), sand and coral, with the front leading light

Charts 664, 848, 597, 748b, 2483.

Chart 667.

beacon bearing 213°, distant about 5 cables. This anchorage affords good shelter during the south-west monsoon, although some swell sets in. The depths decrease gradually, but anchorage in depths of less than 5 fathoms (9^{m}1) is not recommended on account of the swell.

Charts 667, 1389.

Directions.—In clear weather, vessels from southward will find Mount Mangea, described on page 448, a good landmark for making the coast; on a closer approach, the white sandhill northward of the mouth of Mto Sabaki, will be conspicuous to vessels from northward or southward.

Vessels entering Malindi road from southward should bring the summit of Single Tree hill in line with the clump of trees on Leopard point, bearing 341°, and should keep on this mark until Sail rock (*Lat. 3° 17′ S., Long. 40° 07′ E.*) is bearing 220°, and just open eastward of Malindi point, when course should be shaped 040°, keeping Sail rock astern on that bearing, which will lead to the anchorage, described above.

Vessels from southward, entering Malindi road through Stork passage, should bring the summit of Single Tree hill in line with the guard house on the northern bank of Mto Sabaki, bearing 323°, which line leads north-eastward of Griffon patches. When Malindi lighthouse bears 254°, it should be steered for on that bearing until the casuarina trees on Leopard point bear 215°, when course should be shaped to pass eastward of North reef, which can generally be seen, keeping at one or 1½ cables off its eastern edge and avoiding the 3¾-fathom (6^{m}9) patch, about 1¼ miles eastward of Leopard point.

Chart 667.

If anchoring off the town of Malindi, vessels from southward should keep Single Tree hill in line with the guard house on the northern bank of Mto Sabaki, bearing 323°, until the conspicuous bungalow, situated about 5½ cables north-westward of the Custom House, bears 262°, when it should be steered for on that bearing. When on the alignment of the leading light beacons, course should be altered to 213°, which leads to the anchorage.

Vessels from northward should keep the leading light beacons bearing not less than 213°, in order to avoid the shoal patches situated about one mile offshore in the bight northward of the town.

Town.—The town of Malindi is the headquarters of the district of that name. It is a straggling town with several fair-sized houses and is built on a coral beach; the residence of the Commissioner is situated at the north-western end of the town.

Vasco da Gama landed here on his way to India in 1498, and erected the pillar, described above, to commemorate the event.

The district of Malindi is the most productive on the coast of Kenya, and large quantities of maize, sim sim and copra are exported. Fresh provisions are plentiful, the market being in the centre of the town; the water supply, which is obtained from deep wells, is good.

Communications.—Malindi is connected to the general telegraph system.

Chart 1389.

Coast.—Anchorage.—Between Mambrui point and Ras Ngomeni, about 10 miles north-north-eastward, the coast consists of low sandhills

Chart 1389.

covered with bushes, and is fringed with reefs which extend as much as 1½ miles offshore in places. Within the coast, the country for about 5 miles inland to Single Tree hill, is flat.

Ras Ngomeni (*Lat. 2° 59′ S., Long. 40° 14′ E.*), a bold point, with overhanging, coral cliffs, 15 feet ($4^{m}6$) high, is the eastern extreme of a peninsula which forms the southern entrance point to Formosa bay. The southern side of the peninsula consists of sandy beaches, within which are low, scrub-covered hills. An isolated hill, 80 feet ($24^{m}4$) high, stands about 3 cables within the eastern end of the peninsula, whence a ridge extends for about 2 miles westward to a prominent hill, 160 feet ($48^{m}8$) in height, which has two distinctive white sand strips on its northern face.

Good anchorage may be obtained, in depths of 5 or 6 fathoms ($9^{m}1$ or $11^{m}0$), sand, about 2¼ miles south-westward of Ras Ngomeni, where there is a natural harbour within the reefs, with an entrance about 2 cables wide. H.M.S. *Stork* obtained calm and sheltered anchorage here when there was considerable swell outside.

Vessels should approach the entrance steering for the 160-foot ($48^{m}8$) hill, bearing 336°, and when the south-eastern extreme of Ras Ngomeni bears 050°, the latter point should be steered for on that bearing, and anchorage obtained as convenient.

Charts 664, 848, 597, 748b, 2483.

CHAPTER XI

RAS NGOMENI TO FIUME GIUBA ENTRANCE

Chart 848.

RAS NGOMENI TO RAS MBIONGO.—Formosa bay.—Aspect.—Formosa or Ungama bay is entered between Ras Ngomeni and Ras Shaka, about 34 miles north-eastward. Three rivers, Mto Kalifi, Mto Tana and Mto Ozi flow into the bay, the mouths of the two former being about 14 and 20 miles, respectively, northward of Ras Ngomeni, and the mouth of Mto Ozi, about 6 miles westward of Ras Shaka. During the greater part of the year, the shore of the bay south-westward of the mouth of Mto Ozi, is uninhabited.

Apart from Single Tree hill, described on page 450, which can generally be distinguished, and a distant tableland which is usually visible in clear weather, the country within the coast is somewhat featureless, being flat and covered with palms and prickly acacia jungle, with large open spaces which are apparently inundated when the rivers are in flood, and the only features on the shores of the bay which may be identified, are some high mangrove clumps within Ras Kitua (*Lat. 2° 49′ S., Long. 40° 11′ E.*), about 10 miles northward of Ras Ngomeni, some hills near the mouth of Mto Tana, and some hills within Ras Shaka.

Off-lying bank.—In 1948, depths of 80 fathoms ($146^{m}3$) were reported in an area about 27 miles south-eastward of Ras Shaka.

Charts 1389 and 848.

South-western shore of Formosa bay.—Off-lying dangers.—Between Ras Ngomeni, described on page 452, and the mouth of Mto Kalifi, the south-western shore of the bay consists of a sandy beach, within which there are numerous creeks and swamps, and the low land is covered with mangroves and casuarinas; within the swamps is a waterless bush which is frequented only for a few months in each year by natives.

Mto Rasini flows into the southern corner of the bay, about 3½ miles westward of Ras Ngomeni, and the small fishing village of Marereni lies on the coast about 8 miles northward of its mouth; the telegraph cable between Malindi and Lamu passes near Marereni. It is reported that Mto Kalifi has its source in Lake Karawa, and is a deep river with a rapid current.

A 3-fathom ($5^{m}5$) bank fringes the coast between Ras Ngomeni and the mouth of Mto Kalifi, and extends as much as 4½ miles offshore in places. Mwamba Zeboma or Pamamba shoals are several detached drying reefs which lie on the outer part of the above bank and eastward of it, and break heavily. Other shoals, with depths of less than

Charts 597, 748b, 2483.

Charts 1389 and 848.

5 fathoms (9^{m}1) over them, lie northward and eastward of Mwamba Zeboma, and extend as much as 8 miles east-south-eastward of the mouth of Mto Kalifi. During the north-east monsoon, indifferent anchorage may be obtained abreast Marereni village, under the lee of Mwamba Zeboma.

Chart 848.

The summit of Ras Ngomeni bearing more than 212°, leads eastward of the above shoals, and a conspicuous sandhill, situated about 1¼ miles north-north-eastward of the mouth of Mto Kalifi, bearing 275°, leads northward of the shoals and towards the coast in depths which decrease gradually.

Charts 1747, plan of Ozi anchorage, 848.

A shoal with a least depth of 4¼ fathoms (7^{m}8), lies about 4 miles south-eastward of the mouth of Mto Tana, and about 8½ miles north-north-eastward of the northern drying reef of Mwamba Zeboma. The discoloured water from Mto Tana extends as far as this shoal during the period of the falling tide.

Mto Tana.—Between the mouth of Mto Kalifi and the mouth of Mto Tana, about 7 miles north-eastward, the coast consists of sand hills and the entrance to the latter river is not easy to distinguish, but the locality may be identified by a range of hills, from 108 to 140 feet (32^{m}9 to 42^{m}7) high, which lies about 2 miles westward of the entrance. Within the entrance, Mto Tana runs nearly parallel with and close within the coast for about 6 miles, when it turns inland and runs northward to Charra (*Lat. 2° 32′ S., Long. 40° 21′ E.*), which is about 3½ miles within the coast. A telegraph cable crosses the mouth of the river, being suspended from posts on either bank. There is a Custom House at Charra, and the narrow Belaso canal, which connects Mto Tana to Mto Ozi, about 2 miles east-north-eastward, commences here.

During the north-east monsoon, with a suitable tide in the early morning, vessels of a draught up to 6 feet (1^{m}8) could probably enter Mto Tana.

Chart 597.

Mto Tana rises in Mount Kenya, about 250 miles north-westward of its mouth, and flows in a general easterly direction as far as Hameye, about 120 miles eastward, whence its general direction is southward; the river is very tortuous, and Hameye, although less than 200 miles north-north-westward of its mouth, is about 400 miles by river above the entrance. In its upper parts, the river receives several tributaries and flows through uninhabited country, but between Hameye and the sea, the country in most parts is very fertile and is cultivated with rice and coconuts, although practically no tributaries enter it below Hameye.

The floods in the lower river commence in April and May, and when the rains begin on the coast, extensive swamps are formed in the low-lying country, and at certain seasons the river inundates both banks for about 100 miles within its mouth. In November and December, there is another and lesser rise, and in some parts of the lower river, there is a maximum rise of 8 feet (2^{m}4). In June 1891, Mto Tana was ascended as far as Hameye by the S.S. *Kenia*, a small steam vessel of 2½-foot (0^{m}8) draught.

A Government launch makes periodical trips up the navigable

Charts 748b, 2483.

Chart 597.

part of Mto Tana, but owing to the changing nature of the channels and the numerous snags, frequent difficulties are experienced.

Chart 1747, plan of Ozi anchorage.

Head of Formosa bay.—Mto Ozi.—Light.—Beacons.—Between the mouths of Mto Tana and Mto Ozi, about 17 miles east-north-eastward, the shore of the bay still consists of sandhills, which, about 7 miles eastward of the mouth of Mto Tana, greatly increase in height and are here known as Mlima Kitanga tangani. The offshore depths increase gradually off this part of the coast, and the bottom is sandy.

Mto Ozi is entered about 5½ miles west-north-westward of Ras Shaka ; the village of Kipini, consisting of a group of huts surrounding an Arab fort, stands on the eastern entrance point, and in 1892, there was a conspicuous clump of trees on the western entrance point, about one mile westward of the village of Kipini.

A light is occasionally exhibited, at an elevation of 50 feet ($15^{m}2$), from a stone tower, situated at Kipini.

A triangular beacon, 116 feet ($35^{m}4$) high, stands on the eastern bank of Mto Ozi, about 8 cables north-westward of Kipini lighthouse, and a similar beacon stands on the opposite bank, about 2½ cables southward of the first-named beacon ; the telegraph cable crosses the river suspended from these beacons, which are prominent.

There is a small stone pillar on the eastern entrance point, about 3 cables south-eastward of Kipini lighthouse, but it is difficult to distinguish.

In 1912, there was a depth of 1¼ fathoms ($2^{m}3$), on the bar at the entrance to Mto Ozi. In 1892, small dhows could ascend Mto Ozi as far as the Belaso canal, about 14 miles above the entrance.

Kau (*Lat. 2° 30′ S., Long. 40° 27′ E.*), a village similar to Kipini, is situated about 8 miles above the entrance to Mto Ozi ; both villages are markets for the produce of the rich Tana valley, which is brought by boats through the Belaso canal.

Anchorage.—Anchorage, in depths convenient for the vessel's draught, may be obtained southward of the entrance to Mto Ozi, with Kipini lighthouse bearing about 355°.

Northern shore of Formosa bay.—Off-lying dangers.—Buoy.—Anchorage.—Between the mouth of Mto Ozi and Ras Shaka, the northern shore of Formosa bay consists of low, red cliffs and sandy beaches, backed by ridges thickly covered with mkoma palms. Ras Shaka is a low, rocky point, fringed by a drying reef and backed by a ridge covered with jungle which conceals the ruins of the old town of Komona.

A bank on which the depths are less than 3 fathoms ($5^{m}5$), on the outer part of which are numerous islets, the highest of which is 14 feet ($4^{m}3$), as well as several sunken and drying rocks, extends for about 5 miles southward of Ras Shaka. Mwamba Ziwaiu (Zewoyu) or Ozi reefs, are the southernmost of these dangers, the outermost of which is a detached 2½-fathom ($4^{m}6$) patch, which lies about 5½ miles south-south-westward of Ras Shaka.

Lockyer shoal consists of several shoal patches, with a least depth of three-quarters of a fathom ($1^{m}4$), situated on the above bank, north-westward of Mwamba Ziwaiu, and about 2½ miles west-south-westward of Ras Shaka.

A spherical buoy, painted in black and white bands, is moored

Charts 848, 748b, 2483.

Chart 1747, plan of Ozi anchorage.

on the north-north-western side of this shoal, about 2¾ miles westward of Ras Shaka.

Mwamba Mazarui and the dangers fronting the coast north-eastward of Ras Shaka, are described below.

Good sheltered anchorage, in depths of from 3 to 5 fathoms ($5^{m}5$ to $9^{m}1$), may be obtained westward of Mwamba Ziwaiu, about 1½ miles westward of the highest rock. Vessels should approach this anchorage with the extreme of the coast about 3 miles north-eastward of Ras Shaka, bearing 047°, and with the 174-foot ($53^{m}0$) hill, described below, and situated about 9 miles north-eastward of Ras Shaka, shut in.

Chart 1747, plan of Ozi anchorage, 848.

Coast.—Off-lying islets and dangers.—Anchorage.—From Ras Shaka to Ras Tenewiati, a sandy projection on the coast, about 12 miles north-eastward, and thence to Ras Mbiongo, also known as Kanyika point, the south-western entrance point to Lamu bay, about 5 miles farther north-eastward, the coast consists of sandhills, from 50 to 200 feet ($15^{m}2$ to $61^{m}0$) high, of which the most prominent are a group, about 180 feet ($54^{m}9$) high, with a white sand patch on their seaward slopes, situated about 4 miles north-eastward of Ras Shaka, and another sandhill, 174 feet ($53^{m}0$) high, with a sharp boulder on its northern side, situated about 3 miles south-westward of Ras Tenewiati (*Lat. 2° 27′ S., Long. 40° 46′ E.*) ; the hills on Dongo Kundu, a peninsula of which Ras Mbiongo forms the south-eastern extreme, also form good marks.

A line of rocky islets and shoals fronts the coast between Ras Shaka and Ras Mbiongo and extends nearly 3 miles offshore in places; the islets are generally easily visible and show up black against the land. Vessels should give this stretch of coast a wide berth, and should keep in depths of more than 20 fathoms ($36^{m}6$) when coasting.

Mwamba Mazarui, the south-easternmost of these dangers and the only one which dries, lies close north-eastward of Mwamba Ziwaiu, and nearly 3 miles eastward of Ras Shaka ; its outer part dries 4 feet ($1^{m}2$) and it is usually marked by breakers.

Chart 848.

The islets of Tenewe (Tenewi) are a line of rocky islets, from 5 to 40 feet ($1^{m}5$ to $12^{m}2$) in height, situated on a reef about 1½ miles southward of Ras Tenewiati (*Lat. 2° 27′ S., Long. 40° 46′ E.*). The reef is steep-to on its seaward side, but its northern side is connected to Ras Tenewiati by reefs and shoals.

Charts 668, 848.

Kanyika is a rocky islet, 26 feet ($7^{m}9$) high, situated on a reef about 5 miles north-eastward of the islets of Tenewe. Shoals extend about 2 miles south-westward of Kanyika, and vessels should not attempt to pass south-westward of the islet.

Chart 848.

During the north-east monsoon, good anchorage may be obtained westward of the reef surrounding the islets of Tenewe, in depths of about 6 fathoms ($11^{m}0$). Vessels should approach with the prominent 174-foot ($53^{m}0$) hill bearing 302°, which will lead about half a mile south-westward of the reef, and when Kanyika is seen open north-westward of the islets of Tenewe, course may be altered to 037° and anchorage obtained as convenient.

Currents.—Off the coast between Mombasa and Ras Mbiongo,

Charts 597, 748b, 2483.

Chart 848.

the current sets in a general northerly direction, at rates of from 2 to 4 knots during the south-west monsoon, and from one knot to 2 knots during the north-east monsoon.

Charts 668, 848.

RAS MBIONGO TO BOTELER LEDGE.—Caution.—Currents.—Between Ras Mbiongo and Boteler ledge, the north-eastern entrance point to Kiwaihu (Kwyhu) bay, about 34 miles north-eastward, the coast is very irregular and indented, and is fronted by numerous islands, of which the largest are Lamu, Manda and Patta. Between and around these islands there are numerous reefs and shoals, which, in places, extend over 5 miles from their seaward coasts, but vessels of moderate size may obtain sheltered anchorage in Lamu harbour, a narrow channel between the islands of Lamu and Manda, which is entered about 7 miles north-eastward of Ras Mbiongo, and anchorage may also be obtained in Manda roads and Patta bay, which are bights within the reefs fronting the islands of Manda and Patta; in Manda bay, which lies northward of the island of Manda, and in Kiwaihu bay, a bight between Patta and the mainland north-eastward of it. These latter anchorages, however, are but rarely visited, and it is probable that changes have taken place in the formation of mangrove islets and points since they were last examined, and caution is therefore necessary when approaching the anchorages eastward of the entrance to Lamu harbour (*Lat. 2° 17′ S., Long. 40° 45′ E.*).

During the north-east monsoon, the current setting north-eastward along the coast meets the current setting south-westward from the Arabian sea and is overcome by the latter current, resulting in a southerly or south-easterly set. The point of meeting of the current depends on the state of the monsoon but generally occurs between Ras Mbiongo and Isolotto Famauali (Punta Castello), about 60 miles north-eastward.

Chart 668.

There is a strong indraught towards Manda and Patta bays during the period of the rising tide.

Charts 1747, plan of Lamu harbour, 668.

Lamu bay and approaches.—Aspect.—Lamu bay is entered between Ras Mbiongo and Ras Kitao, the south-western extreme of the island of Manda, about 6½ miles north-eastward. The western side of the bay is formed by the rounded peninsula of Dongo Kundu, which rises to an elevation of 221 feet ($67^{m}4$), and on which there are noticeable white sandhills.

The head of the bay is formed by the southern coast of the island of Lamu, its south-western extreme, about 3¼ miles northward of Ras Mbiongo, being separated from Dongo Kundu by Mlango Kipungani, a channel which separates the island of Lamu from the mainland. The southern coast of the island consists of a sandy beach, backed by prominent, white sandhills, from 30 to 250 feet ($9^{m}1$ to $76^{m}2$) high, and partly covered with scrub, which extend up to the western entrance point to Lamu harbour. Within the coast, the island is low, flat and cultivated with coconut palms.

The eastern side of Lamu bay is formed by the south-western end of the island of Manda, which is grassy and covered with low trees

Charts 1747, plan of Lamu harbour, 668.

and thick bushes, on which the low and rocky point of Ras Kitao forms the south-western extreme. Manda peak, 115 feet (35^{m}1) high, stands on the south-eastern coast of the island, about 3¼ miles east-north-eastward of Ras Kitao.

Chart 668.

Dangers in Lamu bay.—The western part of Lamu bay is filled by a 3-fathom (5^{m}5) bank, parts of which dry, which extends about 1½ miles eastward of the extremity of Dongo Kundu.

Kitao knolls are several coral patches situated off the southern coast of the island of Manda. The outermost patch has a depth of 2¾ fathoms (5^{m}0), and lies about 3¼ miles south-south-westward of Ras Kitao. Utende rock, with a depth of 1½ fathoms (2^{m}7) over it, and on which the sea only breaks in the heaviest weather, lies about 2½ miles southward of Ras Kitao.

Chart 1747, plan of Lamu harbour.

Seymour bank is a bank of sand on which the depths are irregular, which lies about 2 miles west-south-westward of Ras Kitao; it has a least known depth of 3 fathoms (5^{m}5) but the depths probably vary with the monsoons.

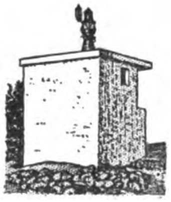
Diamond spit is a drying reef which extends about 6 cables south-south-westward of the western entrance point to Lamu harbour.

A bank, with less than 3 fathoms (5^{m}5), extends about 8 cables southward of Diamond Spit.

A bank, with less than 3 fathoms (5^{m}5), fringes the south-western end of the island of Manda and extends about 7 cables south-westward of Ras Kitao.

Lamu harbour.—Aspect.—Lamu harbour, a narrow inlet lying between the islands of Lamu and Manda, is entered at the north-eastern corner of Lamu bay, its western entrance point being about 7½ miles north-eastward of Ras Mbiongo. There is a bar, with depths of 18 feet (5^{m}5) on it, across the entrance; within the entrance, vessels of moderate size may obtain sheltered anchorage in depths of 4 fathoms (7^{m}3). The town of Lamu is situated on the western shore of the harbour, about 2½ miles northward of the entrance, and the village of Shella (*Lat. 2° 18′ S., Long. 40° 55′ E.*) lies close within the western entrance point.

The German mission house, a building with a thatched roof, situated in the northern part of the town of Lamu, and the slaughter house, a white, rectangular building, with a red roof, about a quarter of a mile northward of the German mission house, are distinctive.



Shella lighthouse, bearing 000°.
(*Original dated* 1936.)

Light.—Signal station.—A light is exhibited, at an elevation of 170 feet (51^{m}8), from a white, rectangular building, 11 feet (3^{m}4) in height, situated about 1¼ miles northward of Ras Kitao and about 2 cables south-westward of Shella village.

A flagstaff, from which signals are made to vessels, stands at an elevation of 170 feet (51^{m}8), on a sand-hill about 120 feet (36^{m}6) northward of the lighthouse.

Port limits.—The port of Lamu includes Lamu harbour and that part of Lamu bay comprised within a radius of 3 miles of Shella flagstaff.

Entrance channel.—Depths.—The entrance to Lamu harbour,

Charts 848, 2952, 597, 748b, 2483.

Chart 1747, plan of Lamu harbour.

about 7½ cables northward of Ras Kitao (*Lat. 2° 19′ S., Long. 40° 55′ E.*), is about 4 cables wide between the extremes of the islands of Lamu and Manda but the channel across the bar and into the entrance is contracted by the banks which extend southward of Diamond spit and south-westward of Ras Kitao, and at its narrowest part is less than one cable wide, although moderately straight. The bar is about 1¼ cables wide, with depths of 18 feet ($5^{\mathrm{m}}5$), and consists of sand and weed, probably overlying rock on the eastern side; with a southerly swell, the sea breaks on both sides of it. Within the bar, the depths increase, and there is a least depth of 20 feet ($6^{\mathrm{m}}1$) in the fairway of the harbour as far as an anchorage abreast the town of Lamu.

Dangers in Lamu harbour.—Mangrove island, a small island, about 8 cables northward of Shella lighthouse, stands on the southern part of an extensive, drying bank which extends from abreast the town of Lamu for about 1½ miles south-south-eastward, and encumbers a large part of the western side of the harbour.

Chapel rock, a rock which dries 8½ feet ($2^{\mathrm{m}}6$), lies on the western side of the harbour, about 4 cables north-north-eastward of Shella lighthouse; several other rocks, some of which dry, extend about 2½ cables northward of Chapel rock.

There are numerous other shoals in Lamu harbour, the positions of which may best be seen on the chart.

Beacons.—Buoys.—A black, octagonal pillar, 25 feet ($7^{\mathrm{m}}6$) in height, stands on the western entrance point, about 2 cables south-south-westward of Shella lighthouse; this beacon, in line with Shella flagstaff, bearing 015°, leads in the channel across the bar, and forms the first leading line into the harbour.

Three white beacons are situated on the eastern shore of the harbour, about 7 cables east-north-eastward of Shella lighthouse. The two southernmost of these beacons in line, bearing 046°, lead in the fairway through the harbour entrance and form the second leading line into the harbour.

Two white, stone beacons, about a quarter of a cable apart, stand near the eastern entrance point, about 7½ cables northward of Ras Kitao; these beacons in line, bearing 184°, lead in the fairway and form, as a stern mark, the third leading line into the harbour.

An iron beacon, surmounted by a triangle, painted in red and white vertical stripes, stands on a sandhill about 1½ cables north-north-eastward of Shella lighthouse; this beacon and Shella flagstaff in line, bearing 221°, lead in the fairway and form, as a stern mark, the fourth leading mark into the harbour.

A beacon, consisting of an iron pole, surmounted by a white triangle, 10 feet ($3^{\mathrm{m}}0$) in height, stands on Chapel rock.

The two easternmost of the three white beacons, situated about 7 cables east-north-eastward of Shella lighthouse, in line, bearing 162°, lead in the fairway and form, as a stern mark, the fifth leading mark into the harbour.

Two red, can buoys, marked "A" and "C", are moored eastward of the bank surrounding Mangrove island, and mark the western side of the channel from abreast the southern extreme of this bank, as far as the anchorage abreast the town of Lamu (*Lat. 2° 16′ S., Long. 40° 54′ E.*).

Charts 848, 2952, 597, 748b, 2483.

Chart 1747, plan of Lamu harbour.

"D" buoy, a red conical buoy, surmounted by a black ball, is moored about 3 cables eastward of the German mission house, and marks the northern end of the bank surrounding Mangrove island.

A shoal, with a least depth of one fathom (1m8) over it, lies about 7 cables north-north-eastward of the German mission house.

Tidal streams.—The tidal streams run at a rate of about 2½ knots in the lower part of the harbour, abreast the village of Shella, and are much stronger than abreast the town of Lamu, especially during northerly winds.

Anchorages.—During the north-east monsoon, sheltered anchorage may be obtained in Lamu bay, westward of the entrance channel, in a depth of 5 fathoms (9m1), sand, with the black pillar on the western entrance point bearing 045°, and the southern extreme of the coast, south-eastward of Ras Kitao, bearing 092°. The tidal streams are scarcely felt at this anchorage, but it is not recommended during the period of the south-west monsoon, as communication by boat is then difficult, if not dangerous.

Anchorage may be obtained close within the entrance, in a depth of 4 fathoms (7m3), with the black pillar bearing 273°, and the western extreme of the coast northward of Ras Kitao bearing 197°. This berth has the most swinging space in the harbour and is a cooler position than abreast the town of Lamu (*Lat. 2° 16′ S., Long. 40° 54′ E.*).

Anchorage may be obtained, in a depth of 4 fathoms (7m3), on the eastern side of the harbour abreast the town of Lamu, with the German mission house bearing 280°, and Shella flagstaff bearing 176°.

Small vessels may obtain anchorage, in a depth of 3 fathoms (5m5), at the upper anchorage abreast the slaughter house, about 7 cables farther north-westward.

Charts 1747, plan of Lamu harbour, 668.

Directions.—Vessels from southward may identify the entrance to Lamu harbour by the prominent white sandhills on the southern coast of the island of Lamu, the whitest of these hills being the easternmost, which is at the western entrance point to the harbour. The sandhills on Dongo Kundu are also noticeable and the islet of Kanyika forms a good mark when open of the land. The island of Lamu is sandy and may thus be distinguished from Manda, the latter having grassy plains covered with low trees and thick bushes.

Vessels should approach the entrance with Shella flagstaff in line with the black, octagonal beacon on the western entrance point, bearing 015°, *see* view B on chart 668, which leads between Kitao knolls and Seymour bank, in a least depth of 5 fathoms (9m1).

Chart 1747, plan of Lamu harbour.

If anchoring in Lamu bay, when the south-eastern extreme of the south coast of Manda bears 065°, course should be altered to 335°, which leads to the anchorage, passing between Seymour bank and the shoals forming the bar.

If proceeding into Lamu harbour, vessels should continue to steer for Shella flagstaff in line with the black pillar, bearing 015°, until a battery on the coast about 6 cables northward of Ras Kitao, is in line with Manda peak, bearing 072°, when course should be altered gradually eastward until the white beacons, situated about 7 cables east-north-eastward of Shella lighthouse and forming the second

Charts 668, 848, 2952, 597, 748b, 2483.

Chart 1747, plan of Lamu harbour.

leading mark, are in line, bearing 046°, when they should be steered for on that bearing, which leads to the lower anchorage.

The out-going tidal stream sets strongly towards Diamond spit, and great care is necessary to keep on the line of the leading marks.

If proceeding farther up Lamu harbour, when the black pillar bears about 300°, course should be altered gradually northward until the white stone beacons, situated near the battery, are in line, bearing 184°, when course should be shaped 004° and the marks kept on astern, until the iron beacon on the sandhill at Shella and Shella flagstaff are in line, bearing 221°, when course should be altered to 041°, and these marks kept in line, astern. When the easternmost pair of beacons, situated about 7 cables east-north-eastward of Shella lighthouse, are in line, bearing 162°, course should be altered to 342°, and these beacons should be kept in line, astern, for a distance of 7 cables, when course may be shaped for the anchorage abreast the town, south-eastward of " C " red can buoy.

Port facilities.—The best landing is at a pier abreast the town of Lamu (*Lat. 2° 16′ S., Long. 40° 54′ E.*), but at low water, the depths alongside its end are very shoal; there are no steps but a ladder.

Several lighters and a steam launch are available.

Fresh provisions, including small quantities of vegetables, may be obtained at Lamu; previous notice should be given.

Water, suitable only for washing purposes or for boilers, can be brought off in open boats.

Town.—The town of Lamu is the headquarters of the district of that name and, after Mombasa, is the principal town in the coastal district of Kenya; it is the residence of a District Commissioner. The town is built on the sandy slopes of the western shore of the harbour, and is backed by coconut palm groves; it consists of a central group of white stone Arab-built offices and residences surrounded by red earth native huts, and has extensive suburbs and a number of stone mosques. A sea front extends the whole length of the town and for about 2 miles south-south-eastward to the village of Shella.

The principal industries are the manufacture of ropes and of mat bags, copra making, and the building of dhows.

In 1950, there was a mixed population of about 6,500, consisting of Arabs, Swahilis and Indians. There were only 5 European residents in 1947.

In 1949, the total tonnage of vessels visiting the port was 41,210 tons.

Communications.—There is irregular and infrequent communication by sea.

Lamu is connected to the general telegraph system; it is connected by telephone to Witu, a town on the mainland, about 25 miles westward.

Charts 668, 848.

Creeks.—Mlango Kipungani, the channel which separates the island of Lamu from the mainland, is available for large boats at low water, springs. It is entered at the western corner of Lamu bay across a bar, on which the depths are shoal and on which there is a considerable sea during the south-west monsoon. Within the bar, the depths increase, and the south-western part of the channel has general depths of from 2 to 3 fathoms (3^m7 to 5^m5) as far as Matadoni, a

Charts 668, 848.

village on the northern side of the island of Lamu, about 3½ miles westward of the town. The in-going tidal streams meet in Mlango Kipungani about one mile eastward of Matadoni, at which position, a bar, with depths of only 6 feet ($1^{m}8$) on it, extends across the channel.

Mlango Mkonumbi (Nkunumbi), a channel, entered close within the south-western entrance to Mlango Kipungani, trends west-north-westward for about 10 miles to the village of Mkonumbi; it has depths of about one fathom ($1^{m}8$) for about 5 miles within the entrance, whence the depths decrease gradually to one foot or 2 feet ($0^{m}3$ or $0^{m}6$) off the village.

Islands of Manda and Patta.—Caution.—Between Ras Kitao, described on page 457, and Ras Taka, about 2½ miles eastward, and thence about 3½ miles north-eastward to Ras Ukove (*Lat. 2° 15′ S., Long. 41° 00′ E.*), the south-eastern coast of Manda is low; there are a few hills, the lower parts of which are sandy, but of a yellower hue than the sandhills on the island of Lamu. From Ras Ukove, a low and rocky point which forms the eastern extreme of Manda, the coast trends north-north-westward for about 2½ miles to Ras Kilindini, a low and sandy point which, in 1878, had some tall casuarina trees on its beach. A drying reef fringes the coast between Ras Ukove and Ras Kilindini, and extends as much as 1½ miles offshore. Manda Toto, an island covered with mangroves, the tops of which were, in 1878, about 35 feet ($10^{m}7$) high and moderately distinctive, stands on the outer part of the above reef, about one mile eastward of Ras Kilindini; its eastern coast is rocky.

The entrance to Kilindini creek lies about 5 cables west-north-westward of Ras Kilindini, whence the northern coast of Manda trends westward for about 1¾ miles to the entrance to Mlango Mkanda, a narrow and tortuous channel, which separates Manda from the mainland and leads to Lamu harbour; Mlango Mkanda dries in places, but is available for boats at half tide. Northward of the entrance to Mlango Mkanda, the coast of the mainland trends northward and forms the western side of Manda bay.

The island of Manda now contains only a scanty population, but the extent of stone ruins attest the former importance of a Portuguese town that once stood on its northern coast.

Patta is a large island situated close north-eastward of Manda, Ras Shongoni (Chongoni), its south-western extreme, being about 2½ miles north-eastward of Ras Kilindini. Patta is almost completely bordered by mangroves, and has a central plateau of raised coral, about 50 feet ($15^{m}2$) high, which is cultivated with coconut palms. Viewed from seaward, the island is featureless, the tops of the trees presenting a uniform line.

Between Ras Shongoni and Patta cliffs, which project from the south coast about 7 miles north-eastward, the coast forms a bight which is fronted by Patta bay. The shore of the bay is low and fringed by drying banks and shoals, which extend as much as 2 miles offshore and make landing difficult at low water. The island of Kisingati (Kizingati) the southern coast of which is fronted by a barrier of rocks at a short distance offshore, which make it distinctive, lies at the head of Patta bay, about 3 miles north-eastward of Ras Shongoni. Patta cliffs somewhat resemble the southern coast of Kisingati, as also do Patta Middle cliffs, about one mile eastward of Kisingati.

Charts 2952, 597, 748b, 2483.

Charts 668, 848.

From Patta cliffs, the coast trends north-eastward for about 5 miles to Siwi point, the eastern extreme of Patta and the south-western entrance point to Kiwaihu bay, whence it trends north-north-westward for about 3 miles to the village of Siwi, which stands at the eastern entrance to the Siyu channel.

The Siyu channel separates Patta from the mainland and connects Kiwaihu bay to Manda bay. The villages of Siyu and Paza or Faza, stand at the head of narrow and intricate creeks, which are entered on the southern side of the Siyu channel. On the northern side of the channel, there are also several creeks, of which the largest is Mongoni creek, situated at the head of Manda bay, but these creeks have only been partly examined; they are not fed by any large river and their navigation appears intricate.

The island of Patta has a large population, mostly inhabiting villages on the north-eastern part of the island, where a considerable amount of dhow building is carried on. The village of Patta (*Lat. 2° 09′ S., Long. 41° 00′ E.*), approached by a creek at the head of Patta bay, is almost deserted, probably on account of the creek becoming filled up.

At the time of the survey of 1878, it was reported that the mangroves at the south-western end of Patta, had increased enormously since the previous survey, and that clumps of trees, previously detached, were then joined to the coast; further extensions were also reported in 1914. Changes may therefore be expected at Ras Shongoni and its vicinity, especially in the islets north-westward of it, which are merely clumps of mangroves on the reef surrounding Patta, and bearings of any mangrove points should not be relied on.

Chart 668.

Manda bay and approaches.—Dangers.—Manda bay is entered by a channel between the island of Manda Toto and Ras Shongoni in which there is a least depth of 8 fathoms ($14^{m}6$) in the fairway. The entrance channel is approached from Manda roads, a roadstead lying between the south-eastern coast of Manda and a chain of banks and shoals extending east-north-eastward, from 2 to 6 miles offshore.

Manda roads may be entered from southward by Muhaji channel, which passes between Prestgrave and Vidal banks, and in which there is a least depth of 6 fathoms ($11^{m}0$), or, from northward, by Barracouta channel, which passes between Vidal bank and Mwamba Hanawi, has depths of over 10 fathoms ($18^{m}3$), and is the best passage for vessels.

Mchangamneni is a coral shoal, with detached patches with depths of from 1½ to 3 fathoms ($2^{m}7$ to $5^{m}5$), situated about one mile east-south-eastward of Ras Taka.

Prestgrave bank, situated about 2 miles eastward of Ras Taka, consists of detached coral shoals, with a least depth of 3 fathoms ($5^{m}5$) on two of the patches.

Neither Mchangamneni nor Prestgrave bank breaks, and they can only be distinguished when close-to.

Vidal bank, the northern end of which lies about 6 miles eastward of Ras Ukove, has several patches with depths of 2¾ and 3 fathoms ($5^{m}0$ and $5^{m}5$), and, as the depths are very irregular, it is possible that shoals, other than those shown on the chart, may exist. The sea is always clear on Vidal bank.

Charts 2952, 597, 748b, 2483.

Chart 668.

Mwamba Hanawi is a detached coral reef, awash, about 4¼ miles eastward of Ras Ukove, and about 1¼ miles north-westward of Vidal bank. It generally breaks at all states of the tide, and, except on its south-eastern side, depths of less than 3 fathoms (5m5), extend about one mile off it.

Clark patch is a knoll, with a least depth of 4¾ fathoms (8m7) over it, situated in the fairway of the approach to the entrance channel, about 2 miles eastward of Ras Ukove.

Mwamba Tawangu is a sunken reef which extends about 1¼ miles east-north-eastward of Ras Ukove and forms an extension southward of the reef surrounding Manda Toto; its southern edge breaks but its eastern edge is not clearly defined.

Gordon reefs are some detached coral reefs, with a least depth of 2 fathoms (3m7), situated on the eastern side of the entrance channel, about 2 miles southward of Ras Shongoni.

Mwamba Kwiyeye is an extensive reef which dries in patches, extending about 3 miles east-south-eastward of Ras Shongoni. The passage between Mwamba Kwiyeye and Mwamba Hanawi should not be used by vessels.

Pazarli rocks (*Lat. 2° 12′ S., Long. 41° 03′ E.*) are several large masses of coral, about 35 feet (10m7) high, which lie near the north-eastern extreme of Mwamba Kwiyeye, about 2½ miles eastward of Ras Shongoni; the easternmost rock is the highest and they can generally be identified.

Iwe-la Manda is an isolated mass of coral, about 25 feet (7m6) high, lying on the southern side of Mwamba Kwiyeye, about 8 cables southward of Ras Shongoni; it is, at times, difficult to distinguish against a background of trees. A chain of flat rocks, which dry 5 feet (1m5), extends over half a mile south-westward of Iwe-la-Manda.

A drying sandbank extends as much as 8 cables north-eastward of Ras Kilindini; its northern extreme is steep-to, but owing to the ripples caused by the tidal streams, it cannot always be distinguished.

Chaka Mzungu, Chindikasi and Mark island are mangrove islets lying on a drying reef which fringes the south-western coast of Patta, about 2½ miles west-north-westward of Ras Shongoni.

Tidal streams.—The tidal streams are strong in the narrow part of the entrance channel to Manda bay, and at times, attain a rate of over 4 knots; even at neaps, their rate is considerable.

Anchorage.—The anchorage recommended in Manda bay is northward of Ras Kilindini, in a depth of 6 fathoms (11m0), with the north-eastern extreme of Manda Toto bearing 118°, distant about 1½ miles.

There is good landing at the entrance to Kilindini creek.

Directions.—The best time for entering Manda bay is at low water, as within Mwamba Tawangu and Gordon reefs, the edges of the reefs on both sides of the entrance channel are moderately steep-to and at this time, are fairly well defined, but no reliance can be placed on distinguishing them as the water is, at times, discoloured. Without local knowledge, vessels should not enter during the period of the in-going tidal stream. With the wind against the tidal stream, the channel is, at times, unsafe for boats.

Vessels entering Manda roads by Muhaji channel, should approach steering for the south-westernmost Pazarli rock, bearing 014°, which

Charts 848, 2952, 597, 748b, 2483.

Chart 668.

leads between Prestgrave and Vidal banks, in a least depth of 6 fathoms ($11^{m}0$).

In 1878, the leading marks for Muhaji channel were the south-western extreme of the islet of Chindikasi in line with the north-eastern extreme of Manda Toto, bearing 332°, *see* view A on chart 668, but owing to the probable extension of the mangroves on these islands, these marks are not now to be depended on and the directions in the previous paragraph are preferable.

Vessels entering Manda roads by Barracouta channel, should approach with Shella flagstaff, described on page 458, in line with a dip close northward of Manda peak, bearing 257°, *see* view C on chart 668, which leads between Vidal bank and Mwamba Hanawi, in depths of over 10 fathoms ($18^{m}3$).

In 1878, the leading marks for the entrance channel were Mark island bearing 327°, and just open eastward of Chaka Mzungu and seen between other islets, *see* view D on chart 668, but in 1914, these marks were reported to be indistinguishable, and no other leading marks can be given.

Vessels should pass between Clark patch and Gordon reefs, taking care to avoid the shoal depths of 5¾ fathoms ($10^{m}5$), about 3 cables northward of Clark patch, and when Iwe-la Manda (*Lat. 2° 13′ S., Long. 41° 01′ E.*) bears 100°, course should be altered to 280°, and Iwe-la Manda kept astern as a stern-mark until the eastern entrance point to Kilindini creek bears 212°, when course may be shaped for the anchorage.

Chart 668, 848.

Patta bay.—Caution.—Dangers.—Patta bay is entered between the south-eastern extreme of Mwamba Kwiyeye and the south-western extreme of Siwi bank, about 5 miles east-north-eastward. The entrance to the bay is obstructed by numerous shoals and reefs, and as the bay is seldom visited and has not been examined since 1824, the plan and the directions, given below, must be used with great caution.

Chart 668.

South Middle bank is a shoal, with a least depth of 3 fathoms ($5^{m}5$) near its western end, situated about 1¼ miles eastward of the Pazarli rocks.

Pazarli ridge is a drying ridge of rocks, the western end of which lies about 2¼ miles eastward of the Pazarli rocks. The ridge is very narrow and some of the rocks near each end dry about 9 feet ($2^{m}7$). A shoal, with depths of less than 3 fathoms ($5^{m}5$), extends about one mile northward of the western end of the ridge, and near the northern extreme of the shoal, is a one-fathom ($1^{m}8$) patch.

North Middle bank is a 3½-fathom ($6^{m}4$) shoal, situated about 2¼ miles south-eastward of Patta cliffs, and about one mile eastward of the eastern end of Pazarli ridge.

Mercer rocks are situated about 1½ miles south-eastward of Patta cliffs.

Charts 668, 848.

Siwi bank is an extensive bank, the northern part of which dries, which fronts the coast of Patta between Patta cliffs and Siwi point; Siwi spit fringes the north-eastern end of the bank, and extends about 3 miles eastward of Siwi point. Sylph rock, which dries about 2 feet ($0^{m}6$), lies on the bank about 3 miles eastward of Patta cliffs.

Charts 2952, 597, 748b, 2483.

Charts 668, 848.

Sylph channel, a narrow passage between Siwi bank and the coast, is used by dhows.

Chart 668.

Entrances.—Patta bay may be entered by South pass, between Mwamba Kwiyeye and Pazarli ridge, and which is obstructed by South Middle bank; the channel eastward of South Middle bank is to be preferred, but there is also a channel westward of it.

The bay may also be entered by North pass, which passes between North Middle bank and Pazarli ridge.

Directions. — Anchorages. — Vessels from southward should approach South pass steering for the north-eastern Pazarli rock, bearing 315°, and when the eastern extreme of the island of Kisingati bears 332°, the latter point should be steered for on that bearing, which leads midway between the south-western end of Pazarli ridge and South Middle bank, to an anchorage, in depths of about 7 fathoms (12^{m}8), with a sandhill on Ras Ukove in line with the Pazarli rocks, bearing 230°.

Charts 668, 848.

Vessels from northward should keep in depths of more than 14 fathoms (25^{m}6) when approaching Siwi bank, and should keep Kiwaihu peak (*Lat. 1° 59′ S., Long. 41° 18′ E.*), described below, bearing less than 022°, until the western extreme of Patta cliffs bears more than 309°, when course may be shaped for the north-eastern Pazarli rock bearing about 280°. When the western extreme of Patta cliffs bears 326°, it should be steered for on that bearing, which leads through North pass between North Middle bank and the eastern end of Pazarli ridge, which latter is probably always visible.

Chart 668.

When within Pazarli ridge, course should be altered westward to steer for the eastern cliffs of Kisingati, until the sandhill on Ras Ukove is in line with the Pazarli rocks, bearing 230°, when course may be shaped about 241°, and anchorage obtained as convenient in depths of about 6 fathoms (11^{m}0).

Charts 670, 848.

Kiwaihu bay.—Dangers.—Kiwaihu bay is entered between Siwi point and Boteler ledge, the south-western extreme of the island of Kiwaihu, about 5½ miles north-eastward, but a large part of the entrance is obstructed by shoals. The north-western part of the bay opens into Siyu channel, and its north-eastern part, westward of the island of Kiwaihu, is much indented and contains numerous islands and inlets, the largest island being called Fazi (Fazy). Fazi harbour and Port Boteler are situated in this part of the bay, but no recent information is available about these two inlets.

The island of Kiwaihu forms the most prominent landmark in this vicinity, on account of its conical peak, 155 feet (47^{m}2) high, situated about 3 miles north-eastward of Boteler ledge. There are other rounded hills and white sandy cliffs on the island, which forms a good landmark when making Kiwaihu or Manda bays from northward.

Boteler bank, with a least depth of 2½ fathoms (4^{m}6), lies nearly in the middle of the entrance to the bay, about one mile southward of Boteler ledge; a detached 2-fathom (3^{m}7) shoal lies about 5 cables westward of Boteler bank, and there are two 3-fathom (5^{m}5) coral patches in the channel between Boteler bank and Boteler ledge.

Charts 2952, 597, 748b, 2483.

Charts 670, 848.

Siwi spit extends about 3 miles eastward of Siwi point, its north-eastern extreme being about 1¾ miles south-westward of Boteler bank.

Entrance channels.—Anchorage.—Kiwaihu bay may be entered by channels which pass on either side of Boteler bank, but the channel northward of the bank is not recommended on account of the two 3-fathom ($5^{m}5$) patches in it.

There are depths of from 5 to 7 fathoms ($9^{m}1$ to $12^{m}8$) in the channel between Siwi spit and the 2-fathom ($3^{m}7$) shoal, westward of Boteler bank.

During the south-west monsoon, the best temporary anchorage is under the lee of Siwi spit in the south-western part of the bay. A good berth is in depths of 6 fathoms ($11^{m}0$), sand, with the eastern extreme of the island of Fazi bearing 012°, and the village of Siwi bearing 288°.

Chart 670.

BOTELER LEDGE TO RAS MTONI, INCLUDING THE JUBA ISLANDS.—General remarks.—The Juba islands, known as Isole Giuba or Isole dei Bagiuni in Italian territory, are a chain of islands, islets and rocks, numbering nearly 500, which extends parallel with the coast between the north-eastern entrance to Kiwaihu bay and Ras Mtoni, about 120 miles north-eastward; they are rarely distant more than 2½ miles from the coast of the mainland, and hence, from a distance, may be mistaken for the latter. The majority of the islands are small and barren and rise abruptly from a narrow connecting line of reefs, in which there are occasional navigable passes, leading to anchorages which afford complete shelter to small craft. In the whole extent of these islands, however, the only anchorage of the slightest importance, is in Fiume Burgao (Birikau), the entrance to which lies about 62 miles north-eastward of Boteler ledge (*Lat. 2° 02′ S., Long. 41° 16′ E.*).

Offshore bank.—Caution.—A bank, on which the depths are very irregular, extends about 3 miles seaward of the Juba islands. On this bank, the general depths are from 7 to 25 fathoms ($12^{m}8$ to $45^{m}7$), but there are numerous coral patches, with depths of 3 fathoms ($5^{m}5$) and possibly less, over them, which make a near approach to the islands dangerous to large vessels.

Vessels not bound for any of the anchorages within the islands, are advised to keep outside the bank of soundings, the edge of which is indicated by a line on the chart; vessels bound for any of these anchorages must be guided by the chart, and, when within the bank of soundings, should proceed with great caution.

Current.—As stated on page 457, at a point between Lamu and Isolotto Famauali (Punta Castello), which varies with the monsoons, the north-eastward-going current is overcome during the north-east monsoon, by a south-westward-going current, resulting in a southerly or south-easterly set. Northward of Isolotto Famauali, however, the currents run with the monsoons, which blow strongly in the vicinity of the islands, and from December to March, when north-easterly winds prevail, the current sets south-westward at a rate of about 2 knots, reversing its direction from April to November, and during this latter period setting north-eastward, nearly parallel with the coast, at from 2 to 3½ knots.

Charts 2952, 597, 748b, 2483.

Chart 670.

Coast.—Islands and dangers.—Anchorage.—Between Kiwaihu peak, described on page 466, and the entrance to Fiume Burgao about 58 miles north-eastward, the coast consists of an almost uniform range of low hills, from 40 to 60 feet ($12^{m}2$ to $18^{m}3$) high, mostly sandy but with a slight growth of scrub.

Kiwaihu knoll, a 5-fathom ($9^{m}1$) patch, with depths of 10 fathoms ($18^{m}3$) close-to, lies outside the bank of soundings, about 3¼ miles eastward of Kiwaihu peak.

Simambaya island lies about 9 miles north-eastward of Kiwaihu peak. The Arletts hills, three hills on the coast of the mainland abreast the southern part of Simambaya island, are moderately conspicuous to vessels approaching from southward, but from north-eastward, are hidden by the central part of Simambaya island.

Kiungamini island lies about 5 miles north-eastward of Simambaya island; rocks extend about 7 cables south-eastward and one mile eastward of the southern extreme of the island.

The mainland abreast Kiungamini island (*Lat. 1° 46′ S., Long. 41° 31′ E.*) appears as two ranges of hills, moderately high and regular; the village of Kiunga stands on the coast abreast the northern end of the island, and there is another village on the coast about 2 miles farther north-eastward, while two black pillars, about 2½ cables apart, are situated on the coast a short distance north-eastward of the latter village. Neither the latter village nor the pillars are shown on the chart.

Anchorage may be obtained, in depths of 12 fathoms ($21^{m}9$), coral and mud, eastward of Kiungamini island, with the north-eastern extreme of the island bearing 320°, distant 1¼ miles.

Ras Chiambone (Dick's head) is a low, rocky promontory, situated about 7½ miles north-eastward of Kiungamini island. At the middle of the promontory, there is a slight rise, with a red, sandy patch on its southern side, and, when seen from eastward, there appears to be a narrow sandy cove at the centre of its rocky face. There are a few low, flat and bluff islets, about one mile south-westward of Ras Chiambone.

Dick's knoll (*Lat. 1° 41′ S., Long. 41° 37′ E.*), a 21-foot ($6^{m}4$) patch, lies about 2 miles southward of Ras Chiambone.

Isolotto Famauali (Punta Castello), a bare islet, somewhat resembling a castle, lies on the outer edge of a drying shore-bank about 2 miles north-eastward of Ras Chiambone; there is a landing place in a sandy cove on its south-western side. Another islet, also resembling a castle, is situated about 3½ miles north-eastward of Isolotto Famauali, and there is a group of low and flat islets, with steep sides, about 5 cables farther north-eastward.

On the coast of the mainland, about one mile northward of Isolotto Famauali, there are some white tombs which are visible from seaward.

Dick's bank, with a least depth of 21 feet ($6^{m}4$) over it, lies about 3 miles east-north-eastward of Isolotto Famauali.

Punta Gome Laecua (Fair point), a bold, round-topped coastal hill, fringed by a sandy beach, is situated about 5 miles north-eastward of Isolotto Famauali, and, with the exception of Collina delle Rose (Rozier hill) described below, is the most conspicuous feature on the coast between Ras Chiambone and the entrance to Fiume Burgao. On the coast close southward of Punta Gome Laecua, are some white

Charts 848, 2952, 597, 748b, 2483.

Chart 670.

patches, which at times are noticeable from seaward, and just northward of the point, is a short range of hummocky rocks, 100 feet ($30^{m}5$) in height, which stand close to the beach.

Ras Scianguani (Sherwood point), a low, rocky and flat-topped point, crowned with a hillock, lies about 3 miles north-eastward of Punta Gome Laecua; it is inconspicuous from seaward.

Sherwood sand, a drying spit which projects about three-quarters of a mile from the coast about one mile north-eastward of Ras Scianguani, has two small islets, named Scoglio Icumbi, lying near its outer edge.

Sherwood reefs lie midway between Punta Gome Laecua and Ras Scianguani, about one mile offshore.

Le secche Scianguani (Sherwood banks), with a least depth of 4 fathoms ($7^{m}3$), lie about 3 miles eastward of Ras Scianguani; Sherwood's Sixes are a line of depths of about 6 fathoms ($11^{m}0$), which extend about 2 miles north-eastward of le secche Scianguani.

About 8 miles north-eastward of Ras Scianguani, there is a projection on the coast, on which is a hill with a ridge of cliffs below its summit; it is most noticeable when bearing about 310°.

Collina delle Rose, situated nearly one mile within the coast, about 11 miles north-eastward of Ras Scianguani, is visible above the coastal hills and is the most prominent landmark in this vicinity. It is flat-topped, its northern face being steep but not bluff, while its southern side is a very gradual slope. Pico delle Rose, about 1½ miles north-eastward of Collina delle Rose is inconspicuous, but the locality may be identified by a huge black rock, shaped like a haycock, which lies between Pico delle Rose and the coast.

Between Collina delle Rose and Mabruch (*Lat. 1° 15′ S., Long. 41° 50′ E.*), a hill about 8 miles north-eastward, the coast becomes more barren and several sandy patches are visible on the coastal range. Rozier rocks, a group of islets and rocks, lie close offshore abreast Pico delle Rose.

Rozier's Sixes are a line of depths of about 6 fathoms ($11^{m}0$), about 4½ miles southward of Collina delle Rose, and about 3½ miles north-eastward of Sherwood's Sixes.

Rozier bank, with a least depth of 3 fathoms ($5^{m}5$), lies about 4 miles eastward of Collina delle Rose, and there is a 5-fathom ($9^{m}1$) patch and a patch with depths of less than 5 fathoms ($9^{m}1$) over it, about 1¼ and 3 miles respectively, north-eastward of Rozier bank.

Chart 1052, plan of Ancoraggio di Burgao.

A shoal, with a depth of 5 fathoms ($9^{m}1$) over it, and a 32-foot ($9^{m}7$) patch, lie about 2¾ miles east-south-eastward and a similar distance south-eastward, respectively, of Mabruch hill.

Fiume Burgao and approaches.—Aspect.—Fiume Burgao is an estuary formed by the confluence of Fiume Chimoti (Chimotu) from northward and Fiume Busci-Busci from westward, which meet about 6 miles north-westward of its entrance.

Fiume Burgao is entered between Punta Gauloni, a cliffy point about 6 cables south-eastward of Mabruch hill (*Lat. 1° 15′ S., Long. 41° 50′ E.*) and Punta Chiembo about 2½ miles east-north-eastward, but both entrance points are fronted by extensive reefs which almost completely obstruct the entrance and leave only a narrow channel into the estuary. There is a bar across the entrance channel, with a least

Charts 848, 2952, 597, 748b, 2483.

Chart 1052, plan of Ancoraggio di Burgao.

depth, in 1939, of about 21 feet ($6^{m}4$) over it. Within the bar, the depths in the channel increase and anchorage in a depth of 9 fathoms ($16^{m}5$) may be obtained about 2¼ miles north-north-eastward of Mabruch hill.

The banks of the estuary are of coral, fringed with a narrow belt of mangroves, within which the country is thickly covered with thorn bushes of a characteristic grey colour, passage through which is only possible with some difficulty.

Mabruch hill, 142 feet ($43^{m}3$) in height, standing about 6 cables north-westward of Punta Gauloni, has a slight dip in its summit when seen from southward.

Simovongo, a hill, 201 feet ($61^{m}3$) in height, is the highest summit of a small range lying about 2½ miles north-westward of Mabruch hill; close northward of its summit is a saddle, which is distinctive from eastward.

Collina del Lione or Mlima Simba, an isolated hill about 152 feet ($46^{m}3$) in height, with gradually sloping sides, lies about 2½ miles north-north-westward of Simovongo.

Mlima Chidei, a 96-foot ($29^{m}3$) summit, stands on the eastern side of the entrance about 3¾ miles north-eastward of Punta Gauloni.

Dangers.—Between Punta Gauloni and a position about 2½ miles northward, the south-western side of the estuary is fronted by an extensive drying reef of sand and coral, which extends as much as 9 cables offshore and on which lies Isolotto Chiuapisci, a green-covered islet, 30 feet ($9^{m}1$) in height, situated about 1¼ miles north-eastward of Mabruch hill (*Lat. 1° 15′ S., Long. 41° 50′ E.*). The outer edge of the above reef is fringed by a 3-fathom ($5^{m}5$) bank, which extends about one mile east-south-eastward of Isolotto Chiuapisci, and northward of this island is marked by posts; southward of this 3-fathom ($5^{m}5$) bank is an extensive area, known as Hood reefs, which is filled with pinnacle rocks and sunken dangers, on the south-eastern edge of which, the sea breaks heavily.

Isolotti Chete Chete, a group of islets, surrounded by a drying reef, lie off the north-eastern end of Hood reefs about 1¾ miles east-north-eastward of Punta Gauloni. The northern islet is 20 feet ($6^{m}1$) in height.

Scoglio Ago, a rock 10 feet ($3^{m}0$) in height, lies near the southern end of Hood reefs, about 9 cables southward of Punta Gauloni.

Punta Chiembo, the north-eastern entrance point to the estuary, is also the south-western extreme of Penisola Burgal (*see* page 472).

A ledge, with less than 3 fathoms ($5^{m}5$), on which stands Isolotto Chiua Camlango, an above-water rock 20 feet ($6^{m}1$) in height, extends about 2½ cables south-westward of Punta Chiembo. The sea breaks at some distance off the ledge.

Isolotti Divadicioci, a chain of islets, extend about 6 cables north-eastward from a position 5 cables east-north-eastward from Punta Chiembo.

Between Punta Chiembo and Punta Iunda, about 1¼ miles west-north-westward, is a bay, the shores of which are fringed by a drying bank of sand and coral, outside which, the bay is almost filled with rocks and foul ground on which the sea breaks, leaving only a small clear space, close westward of Punta Chiembo, which is known as Porto Chiembo, and which affords anchorage for small craft. Isolotto

Charts 670, 848, 2952, 597, 748b, 2483.

Chart 1052, plan of Ancoraggio di Burgao.

Iscecomba lies near the outer edge of the drying bank, about 5 cables north-westward of Punta Chiembo (*Lat. 1° 14′ S., Long. 41° 52′ E.*).

Between Punta Iunda and Punta Chiueni, about 7 cables north-westward, the north-eastern bank of the estuary is fringed by a reef, which extends from half a cable to 1½ cables offshore.

Entrance channel.—Depths.—The entrance to the navigable channel lies between the foul ground extending northward of Isolotti Chete Chete and that extending southward of the bay between Punta Chiembo and Punta Iunda; there are depths of 22 to 27 feet ($6^{m}7$ to $8^{m}2$) on the entrance leading lines between Punta Chiembo and Punta Iunda. Beyond this point the depths gradually increase and there are depths of from 29 feet to 13 fathoms ($8^{m}8$ to $23^{m}8$) in a navigable channel about 1½ cables wide, which leads to the anchorage about 6 cables north-north-eastward of the village of Burgao (*Lat. 1° 13′ S., Long. 41° 50′ E.*).

Beacons.—A beacon stands on the south-western extremity of Punta Chiembo.

The front beacon of three leading beacons stands on the eastern side of Isolotto Chiuapisci; the middle beacon stands about 5 cables west-north-westward of the front beacon, and the rear beacon on Simovongo hill. These beacons in line, bearing about 288°, form the first leading line into the harbour.

The front beacon of a pair of leading beacons stands on the north-eastern side of the entrance about 3¾ cables north-westward of Punta Iunda, on which there is also a pillar; the rear beacon of the pair stands about 4 cables north-westward of the front beacon. These beacons in line, bearing about 319°, form the second leading line into the harbour. In 1952, these beacons were reported as not visible from seaward.

The front beacon of a pair of leading beacons stands on the western side of the entrance about 4 cables northward of Isolotto Chiuapisci, the rear beacon being about the same distance north-westward of the front beacon. These beacons in line, bearing about 301°, form the third leading line into the harbour. In 1952, the rear beacon was reported to have fallen down.

A beacon stands on a point on the north-eastern side of the river about 3 miles north-north-westward of Punta Iunda.

Tidal streams.—Anchorages.—The in-going tidal stream runs at a rate of 1½ knots and the out-going tidal stream, at about 2 knots.

Anchorage may be obtained in mid-channel about 6 cables north-north-eastward of Burgao village in a depth of 9 fathoms ($16^{m}5$).

During the north-east monsoon, sheltered anchorage may be obtained by small craft in Porto Chiembo (*Lat. 1° 14′ S., Long. 41° 52′ E.*).

Temporary anchorage may be obtained outside the bar, but vessels should be prepared to leave this anchorage at short notice.

Directions.—During the south-west monsoon there is usually a heavy sea on the bar, especially during the period of the out-going tidal stream, and entry at these times is dangerous; owing to the narrow width of the channel, caution is necessary at all times.

Vessels approaching the estuary may readily identify Mabruch hill and Collina delle Rose. The break in the coastline between Mabruch hill and Penisola di Burgal is very noticeable.

Vessels should approach the entrance with the beacons on Isolotto

Chart 1052, plan of Ancoraggio di Burgao.

Chiuapisci and Simovongo hill in line with the middle beacon mentioned above, bearing about 288°, which leads over the bar in a depth of about 22 feet ($6^{m}7$); when the leading beacons north-westward of Punta Iunda come into line, bearing about 319°, keep them so until the leading beacons north-eastward of Burgao village come into line, bearing about 301°; keep these latter beacons in line until the beacon on Isolotto Chiuapisci bears 255°, when course may be altered north-westward to 320½° to pass about one cable off Punta Chiueni, whence a mid-channel course leads to the anchorage.

The edges of the reefs show distinctly when within Isolotto Chiuapisci.

Villages.—The present village of Burgao, a tiny settlement with, in 1936, only about 20 inhabitants, is situated about 1¾ miles northward of Punta Gauloni. About 2 cables northward of the village are the ruins of a formerly flourishing village, which was abandoned owing to the spread of the Tsetse fly and the consequent dearth of cattle. The best landing place is just northward of the ruined village. No provisions or water are obtainable, and the locality abounds with dangerous snakes.

According to an Italian report of 1936, Fiume Busci-Busci is navigable during the dry season by vessels of a draught of 4 feet ($1^{m}2$) for about 15 miles to Buscbusci, but the country between Buscbusci and Burgao is almost uninhabited except by big game.

Coast.—Islands and dangers.—From Punta Chiembo, described on page 470, the eastern coast of Penisola di Burgal trends north-eastward for about 3 miles and terminates at Ras Burgal, close north-eastward of which is a small island. Isola Ciandrà, an island, which has a long sandy beach on its south-eastern side, lies about one mile north-eastward of Ras Burgal. Isolotti Langua Pembe, two islets, lie between Ras Burgal and the south-western extreme of Isola Ciandrà (*Lat. 1° 11′ S., Long. 41° 55′ E.*).

A bank, with depths of from 23 to 36 feet ($7^{m}0$ to $11^{m}0$) over it, extends north-eastward from a position about 12 cables south-eastward of Ras Burgal; two detached 35-foot ($10^{m}7$) patches lie about 2½ and 5 cables south-westward of the south-western end of the bank.

Bender Micalà.—Anchorage.—Bender Micalà is a bight lying between Ras Burgal and Isola Ciandrà, and is a commodious harbour for coasting craft, but the depths in it are irregular and generally from 10 feet ($3^{m}0$) to 4 fathoms ($7^{m}3$). The shore of the mainland at the head of Bender Micalà is thickly wooded.

There is a least depth of 16 feet ($4^{m}9$) in an entrance channel which lies between the southern extreme of Isola Ciandrà and Isolotti Langua Pembe, about 2½ cables south-westward.

Anchorage may be obtained close within the entrance in depths of from 3 to 4 fathoms ($5^{m}5$ to $7^{m}3$).

The water flow of both the rising and falling tide set northward during the south-west monsoon, and southward during the north-east monsoon, since the tidal streams are too weak to overcome the monsoon currents.

Chart 670.

Coast and islands.—About 3 miles northward of Isola Ciandrà, the coastal range leaves the coast and extends northward for about 4 miles at from three-quarters of a mile to 1½ miles inland, there

Chart 670.

being a plain between the range and the coast. A bluff hill, formed by a dip in the range, about 5 miles northward of Isola Ciandrà, is difficult to identify, but about 2 miles southward of this hill, there is a large, square, flat-topped rock, which rises above the level range and is noticeable from seaward.

Isola Daracas (Darakas), situated about 4 miles north-eastward of Isola Ciandrà, is hilly, its northern end being higher than the southern; the eastern side of its southernmost hill is bare and sandy.

Vidal ledge, a chain of islets and rocks, extends about 2¼ miles north-eastward of Isola Daracas (*Lat. 1° 05′ S., Long. 42° 00′ E.*).

Isola Ciula (Tula) is situated about 3 miles north-eastward of Isola Daracas; there are numerous sandhills along its whole extent, the inner slopes of which are covered with mimosa trees and bushes. The fishing village of Ciula (Tula) is situated on the north-western part of the island, and, in 1936, had a population of about 300. Good water may be obtained from a well near the village.

Porto Ciula.—Anchorage.—Porto Ciula (Tula) is a large bight, lying between Isola Daracas and Isola Ciula; it is entered between Vidal ledge and some islets lying about one mile south-westward of Isola Ciula. Lac Anole (Fiume Ciula) enters the sea at the head of Porto Ciula; there are a number of Portuguese ruins on the banks of the river near its entrance.

There are depths of from 5 to 10 fathoms ($9^{m}1$ to $18^{m}3$) in the entrance to Porto Ciula, but within the entrance, the depths decrease suddenly to about 3 fathoms ($5^{m}5$); the mouth of Lac Anole is closed by a bar, on which the depths are very shoal and irregular.

Anchorage, in depths of 3 fathoms ($5^{m}5$), may be obtained northward of Vidal ledge, with the western extreme of Isola Ciula bearing 034°, and the southernmost islet, south-westward of Isola Ciula, bearing 106°.

Anchorage may also be obtained, in depths of 2 fathoms ($3^{m}7$), in a limited space westward of Isola Ciula, near the village of Ciula; dhows water here before proceeding northward during the south-west monsoon, and water may also be obtained from wells near a small village at the south-western entrance point to Lac Anole.

The tidal streams are strong in Porto Ciula (*Lat. 1° 02′ S., Long. 42° 02′ E.*).

Islands and dangers.—Isola Ciovai (Ciuài) lies about 6 miles north-eastward of Isola Ciula, the intervening space being nearly filled by a chain of islands and islets, of which the largest are Iundu Iundu (Tegadi), Cuvumbi (Hoäther) and Bengadini (Ngai), situated about 1½, 3 and 5 miles, respectively, north-eastward of Isola Ciula.

Isola Ciovai is high with bare sandhills, the most prominent of which are near its southern end, where there are several low, rocky islets close off a high, sandy beach. About half-way up the hill, situated about one mile from the northern end of the island, there is a white house, and close southward of the house, there are some ruins and a distinctive strip of white sand, which extends diagonally from the beach to the summit of the hill.

The fishing village of Ciovai (Ciuài) is situated on the western side of the island, and in 1936, had a population of upwards of 300. A limited supply of water is obtainable.

Banco Ciula (Tula banks) lies about 2 miles eastward of the

Chart 670.

southern part of Isola Ciula; Banco Cuvumbi (Hoäther bank) lies about the same distance eastward of Isola Cuvumbi, and Banco Ciovai (Tovai bank) lies about 2¼ miles eastward of the southern part of Isola Ciovai; there are depths of 6 fathoms ($11^{m}0$), rock, on the latter bank, and it is probable that other shoal patches exist. The positions of banks near the islands are generally indicated by the colour of the water, and such positions should always be avoided.

Porto Ciovai.—Porto Ciovai (Port Shamba) lies between the south-western end of Isola Ciovai and the coast of the mainland. Lac Salamo (Mto Tovai) enters the sea at the head of the harbour, but its approach from Porto Ciovai is closed by a bar which nearly dries; within the bar, the depths increase considerably.

Porto Ciovai may be entered by two passages, one on either side of Isola Bengadini, but the northern passage, although the most direct, has depths of only 9 feet ($2^{m}7$), and the sea breaks right across it with even a moderate swell.

The passage southward of Isola Bengadini has patches of 3 fathoms ($5^{m}5$) and 3½ fathoms ($6^{m}4$) in its centre and some sunken rocks about 5 cables westward of the latter patch. Depths of 6 and 7 fathoms ($11^{m}0$ and $12^{m}8$) will be found northward and north-westward of the sunken rocks.

Coast.—Islands.—Isola Ambu (Thenina) lies close north-eastward of Isola Ciovai; it is of a brownish colour and of less elevation than Isola Ciovai or Isola Ngumi, described below. Between Isola Ambu and the coast of the mainland, there is a large bight, known as Porto Tanina (Thenina), but no information is available about the approaches to this harbour.

Isola Ngumi (Vuma) is situated about 3½ miles north-eastward of Isola Ambu, the intervening space being filled by a chain of islets; Isola Ngumi rises gradually to a summit, about 170 feet ($51^{m}8$) high at its centre.

On the coast of the mainland, between Isola Ambu and Isola Ngumi, about 3 miles northward of the northern extreme of Isola Ambu, there is a steep bluff, which is prominent from seaward.

Isola Coiama (Kwayama) lies about 2½ miles north-eastward of Isola Ngumi, and, in 1936, had on it a few mimosa and baobab trees and a group of palms. An isolated, white house on the eastern side of the island, is noticeable when bearing less than 313°. The fishing village of Coiama (Kwayama) lies on the north-western side of the island, and, in 1936, contained a population of about 100. Brackish water is obtainable at the village.

Isola Coima is the northernmost of the large and prominent islands of Isole Giuba, and forms a useful mark for fixing a vessel's position.

Porto Coiama.—Anchorage.—Porto Coiama (Port Kwayama), is a large area contained between the western side of Isola Ngumi, the south-western side of Isola Coiama, and the coast of the mainland; it may be entered either from northward or southward of Isola Coiama.

The southern passage lies between the southern extreme of Isola Coima and Scoglio Dubbio (Doubt rock) (*Lat. 0° 41′ S., Long. 42° 20′ E.*), an above-water rock, about 7 cables south-westward. The eastern and southern coasts of Isola Coiama are fringed by a reef, and shoal depths are reported within half a cable of Scoglio Dubbio,

Charts 848, 2952, 597, 748b, 2483.

Chart 670.

and there is a 2½-fathom (4^{m}6) patch in the centre of the passage, about 3 cables north-westward of Scoglio Dubbio, but there are depths of from 4 to 6 fathoms (7^{m}3 to 11^{m}0) in narrow channels, about 1½ cables wide, on each side of the 2½-fathom (4^{m}6) patch.

Within the pass, anchorage may be obtained, in depths of from 4 to 5 fathoms (7^{m}3 to 9^{m}1), off the south-western coast of Isola Coiama, or westward of the rocky islets which extend north-eastward of the northern extreme of Isola Ngumi (*Lat. 0° 42′ S., Long. 42° 18′ E.*).

Coast.—Islets and dangers.—Between Isola Coiama and Ras Mtoni, the south-eastern extreme of a promontory on the coast of the mainland, about 12 miles north-eastward, an almost continuous chain of islets, rocks and reefs extends parallel with the coast for about 9 miles north-eastward of Isola Coiama. The Schmalcalder chain and the Humaul rocks are reefs which lie about 2 miles offshore, and the Hawaween chain extends parallel with the two former reefs, about 3 miles offshore.

Schmalcalder's Sixes lie about 4½ miles east-north-eastward of Isola Coiama, and other shoal patches lie from 3 to 4 miles offshore near the Hawaween chain of reefs, and should be given a wide berth.

Chart 1052, plan of Baia di Chisimaio, 670.

BAÍA DI CHISIMAIO AND APPROACHES.—Aspect.—Baía di Chisimaio is a bight in the coast between Ras Ogaden, the north-eastern extreme of the promontory of which Ras Mtoni, described above, forms the south-eastern extreme and Isola Serpenti, about 6 miles north-eastward; it is the northernmost anchorage on the east coast of Africa which can be considered as a harbour, and is better than any other northward of Manda bay, being accessible in all seasons and affording shelter to vessels of moderate draught.

The coast surrounding the bay presents few conspicuous features, being undulating and often obscured by haze. The soil is sandy and covered with grass and dotted with low bushes and mimosa trees, but, northward of the entrance to Fiume Giuba (Juba river), about 9 miles north-eastward of Isola Serpenti the coast becomes more bare and sandy.

Within the bay, the coastal hills appear as an undulating ridge, and are not conspicuous. Collina Rotonda 226 feet (68^{m}9) in height, about 2½ miles north-north-westward of Ras Ogaden, shows up when bearing less than 264°, but on no bearing is very conspicuous. A wooded peak, about 2 miles west-north-westward of Isola Serpenti, has its summit more serrated than the hills adjoining it.

Murder hill, a small conical hill, about 4½ miles northward of Isola Serpenti, is no higher than the adjacent plateau, but may be identified from its shape and by a distinct dip on either side of it; it is best distinguished when bearing about 309°. A rounded bluff, on which the bush is denser than elsewhere, stands at the entrance to Fiume Giuba, and may be identified although not very conspicuous.

Chart 1052, plan of Baia di Chisimaio.

The town of Chisimaio is situated on the northern shore of the bay about a mile north-westward of the northern extremity of Isola Serpenti. In the town are a church, a mosque and a wind pump; a tower stands on a hill in the north-eastern outskirts. About a mile westward of the town some white sandhills may be seen.

Charts 848, 2952, 597, 748b, 2483.

Chart 1052, plan of Baia di Chisimaio.

Islets and rocks.—Light.—Smyth islet and an unnamed islet, each 15 feet ($4^{m}6$) in height, about 5 cables east-north-eastward and 3 cables eastward, respectively, of Ras Mtoni, lie on a drying reef, which fringes the promontory between Ras Mtoni and Ras Ogaden (*Lat. 0° 27′ S., Long. 42° 29′ E.*).

Isolotti Cordata, 4 islets, the largest of which is dome-shaped and 25 feet ($7^{m}6$) in height, lie on a sunken reef, which fronts the drying reef mentioned above, about 1¾ miles east-south-eastward of Ras Ogaden.

Isola Pescicani is a flat-topped island, covered with low scrub, which lies on the north-eastern edge of the drying reef about 1¼ miles north-eastward of Ras Ogaden. The island is difficult to identify in some lights, but stands out clearly with any haze over the mainland.

Isolotto Verde, 25 feet ($7^{m}6$) high, is situated about 2 cables north-north-westward of Isola Pescicani and forms a useful mark.

Scoglio Pilone (Pillar rock) stands on a drying reef which fringes the shore of the bay, about 3 miles northward of Isola Pescicani; it is 52 feet ($15^{m}8$) high, resembles a sail, and generally shows up black against the coast. It can usually be seen from a considerable distance seaward, but has been reported as difficult to distinguish in the morning.

Isolotto Favatu is a small island, 13 feet ($4^{m}0$) in height, situated about 1½ miles east-south-eastward of Scoglio Pilone.

Isola Serpenti lies close offshore at the northern end of the bay and has a reddish yellow appearance when compared with the land behind it, which is mostly green, with white sand patches. There is a small dome-shaped hummock at its south-western extreme, which is connected to the main part of the island by a low neck of land.

A light is exhibited, at an elevation of 115 feet ($35^{m}0$), from a circular masonry tower on a square white building situated about 3 cables north-eastward of the southern extremity of Isola Serpenti.

Isolotti Tomba, three in number, lie about 2¼ miles north-eastward of Isola Serpenti to which they are connected by a rocky ledge, which dries near its south-western end and on which the sea breaks in places; the southern and largest islet is 40 feet ($12^{m}2$) high and the northern, a bare black rock, 28 feet ($8^{m}5$) high. The islets stand on a rocky ledge which dries, extending about a mile north-north-eastward from the northern islet. The islets show very green after rain.

Dangers.—The entrance to Baía di Chisimaio is barred by a series of reefs and shoals, of which the outermost takes the form of a narrow coral barrier which extends roughly parallel with the coast, from 2½ to 3½ miles offshore. This barrier, known as the Owen barrier, has depths of from 13 to 36 feet ($4^{m}0$ to $11^{m}0$) on it, and forms an extension northward of the Hawaween chain, described on page 475; it terminates abreast Isolotti Tomba, and Secca Avvoltoio (*Lat. 0° 22′ S., Long. 42° 37′ E.*) with a least depth of 14 feet ($4^{m}3$) situated about 3¾ miles east-north-eastward of Isola Serpenti, is near its north-eastern end. Secca Avvoltoio is covered by the *red* sector of the light on Isola Serpenti between the bearings of 250° and 262°.

Daedalus knoll, a shoal with a least depth of 15 feet ($4^{m}6$) lies on the Owen barrier, about 2 miles south-eastward of Isola Serpenti.

In 1885, a 39-foot ($11^{m}9$) patch was reported about one mile south-eastward of the southern part of the Owen barrier, and about 3¾ miles south-eastward of Isola Pescicani.

Charts 670, 848, 2952, 597, 748b, 2483.

Chart 670.

Shoal water, no details of which were given, was reported, in 1940, between positions about 5 miles southward and 4½ miles east-south-eastward of Isola Pescicani.

Chart 1052, plan of Baia di Chisimaio.

Within the Owen barrier there are numerous dangers, of which the principal ones are described below and the positions of the remainder can best be seen on the chart.

Secca di Mezzo, with depths of from 3 feet to 3 fathoms (0^{m}9 to 5^{m}5) over it, extends about 2 miles north-eastward from a position nearly 2 miles eastward of Isola Pescicani; depths of from 3 to 6 fathoms (5^{m}5 to 11^{m}0) extend north-eastward and south-westward from the shoal which is thus practically joined to Owen bank, north-eastward, and to the shoals in the vicinity of Isolotti Cordata, south-westward.

Blankett knoll, with a depth of 3 fathoms (5^{m}5) over it, lies on the south-western extension of Secca di Mezzo about 1½ miles south-eastward of Isola Pescicani.

A ridge of reef, with depths of less than one fathom (1^{m}8) over it, connects Isola Serpenti and Isolotto Favatu, and depths of less than 2 fathoms (3^{m}7) extend about 5 cables south-westward of the latter islet. A narrow spit, on which the depths vary from 3 to 5 fathoms (5^{m}5 to 9^{m}1), extends about 1½ miles north-eastward from Isola Pescicani.

Fred rock, a pinnacle rock with a depth of one fathom (1^{m}8) over it, lies nearly 1½ miles southward of Scoglio Pilone; a similar rock lies 1¼ cables north-north-eastward of Fred rock (*Lat. 0° 25′ S., Long. 42° 31′ E.*).

A rocky shoal, about 3 cables in length, with a least depth of 8 feet (2^{m}4) at its southern end, lies about 7 cables northward of Fred rock and a depth of 17 feet (5^{m}2) lies about 4 cables north-north-westward of the same rock.

A 17-foot (5^{m}2) patch lies about 4 cables north-westward of Isolotto Favatu.

From a position on the reef which joins Isola Serpenti and Isolotti Tomba, about three-quarters of a mile south-westward of the latter, a narrow tongue, with depths of 31 to 35 feet (9^{m}4 to 10^{m}7) over it, extends about 2 cables south-eastward. 35-, 13- and 25-foot (10^{m}7, 4^{m}0 and 7^{m}6) patches lie about 3½ cables south-eastward, 3½ cables north-eastward and one mile north-eastward, respectively, of the 40-foot (12^{m}2) Tomba islet.

Secca Delfino, with a depth of 3 fathoms (5^{m}5) over it, lies about 2¾ miles north-eastward of the same islet. Between this shoal and the coast westward are numerous other shoals, with depths of from 5 to 36 feet (1^{m}5 to 11^{m}0) over them, the positions of which can best be seen on the chart. A shoal, with a depth of 20 feet (6^{m}1) over it, lies about 6 cables eastward of the northern extreme of the same drying reef.

Passes.—Caution.—There are two passes leading into the bay: Passo Nord, leading northward of, and Passo di Levante leading across Owen barrier. Within the barrier, Passo Interno leads into the inner part of the bay.

In moderate weather, vessels from southward or eastward may use Passo di Levante, but with a heavy sea, much wind and a strong current, vessels are recommended to use Passo Nord, as the channel is wider and the depths are greater. Vessels from northward are recommended to use Passo Nord at all times.

Passo di Levante, a break in the Owen barrier in which there was, in 1942, a least depth of 29 feet (8^{m}8), close southward of the leading line (page 479), near its eastern end, passes along the edge of the 5-fathom (9^{m}1) line about 5 cables southward of Daedalus knoll and thence to the approach to Passo Interno (*Lat. 0° 25′ S., Long. 42° 32′ E.*).

Passo Nord, the channel generally used to enter Baía di Chisimaio, passes northward of the northern end of the Owen barrier, in a least depth of 10 fathoms (18^{m}3).

Passo Interno leads between the reef extending south-westward of Isolotto Favatu and the spit extending north-eastward of Isola Pescicani in a least depth, in 1940, of about 5 fathoms (9^{m}1).

There are many places on the Owen barrier where the depths are sufficient to permit passage, but unless the leading marks can be clearly seen, not even the smallest vessel should attempt to cross it, as there is always a heavy swell, and only on the lines of the leading marks were the passes closely examined, and elsewhere there may be less depths than are shown on the chart.

The water is very thick, especially during the north-east monsoon, when the muddy water from Fiume Giuba discolours the sea for many miles.

Obstructions.—There are numerous uncharted wrecks and obstructions, some of which are submerged, in the inner harbour.

Lights.—Beacons.—Buoyage.—Leading lights for Passo Interno are established on the eastern slope of Collina Marca. The front light is exhibited about 3 cables north-westward of Scoglio Pilone, and the rear light about 2 cables north-westward of the front light. These lights in line, together with the two beacons mentioned on page 479, bearing about 325°, lead through the fairway of Passo Interno.

Leading lights are established on the north-eastern shore of the bay. The front light is exhibited from a white pyramid with black bands, situated on the beach about 4 cables eastward of the town of Chisimaio (*Lat. 0° 22′ S., Long. 42° 33′ E.*); the rear light is exhibited from a similar structure, about half a cable north-eastward of the front light. The lights in line, bearing about 030°, lead from Passo Interno to an anchorage southward of the town, and westward of Isola Serpenti, passing close eastward of the 17-foot (5^{m}2) patch, situated about 4 cables north-westward of Isolotto Favatu.

The limits of the 3-fathom (5^{m}5) line on the eastern and western sides of the above anchorage are marked by buoys; the eastern buoy, moored about 5½ cables westward of Isola Serpenti light-structure, is a conical buoy, painted black and surmounted by a conical topmark; the western buoy, moored about 5 cables farther westward, is a can buoy, painted red and surmounted by a cylindrical topmark. A buoy is moored about three-quarters of a cable north-westward of the eastern buoy mentioned above.

Leading beacons stand on the western shore of the bay. The rear beacon, on Collina Rotonda is prism-shaped and 33 feet (10^{m}1) in height, with the upper part painted in black and white chequers, and the lower part black; the front beacon is an obelisk, similarly painted

Chart 1052, plan of Baia di Chisimaio.

and 26 feet ($7^{m}9$) in height, situated about 8 cables eastward of the rear beacon. These beacons in line, bearing about 269°, lead through the fairway of Passo di Levante, in a depth of about 5 fathoms ($9^{m}1$), and also to the approach to Passo Interno and to the entrance of the anchorage on the southern side of the bay.

A beacon, consisting of an obelisk on a square base, painted white, stands on the northern extreme of Isola Serpenti. This beacon in line with the beacon on Collina Rotonda, bearing about 247°, leads through the fairway of Passo Nord to about 2 miles from the front beacon.

A beacon, 52 feet ($15^{m}8$) in height, stands on the south-eastern extremity of Scoglio Pilone and a white beacon is situated about 1½ cables south-eastward of Scoglio Pilone (*Lat. 0° 23′ S., Long. 42° 31′ E.*).

Leading beacons, painted in black and white chequers, are established for the southern anchorage. The front beacon is situated on the high water line about 8¼ cables west-north-westward of Ras Ogaden; the rear beacon is about 7 cables south-westward of the front beacon. These beacons in line, bearing about 234°, lead into the anchorage.

A white pillar, 12 feet ($3^{m}7$) in height, stands at an elevation of 25 feet ($7^{m}6$), on Isolotto Favatu.

A beacon stands on the northern part of Isola Serpenti about 2 cables southward of the beacon on the northern extremity of the island.

Current.—The current setting along the coast passes inside the Owen barrier and sweeps the coasts of the off-lying islets. Caution is therefore necessary when entering the bay, as, during either monsoon, the current sets directly across the passes, and great care is required to keep on the line of the leading marks, even when in Passo Interno.

The current is occasionally irregular, both in strength and direction, and, in 1895, it was reported that, in a position about 22 miles eastward of Baía di Chisimaio, in depths of from 600 to 800 fathoms ($1097^{m}3$ to $1463^{m}0$), a current setting continuously 250° at a rate of from 3½ to 4 knots, was observed from the 5th to 12th January.

Anchorages.—Large vessels usually anchor, in depths of about 6 fathoms ($11^{m}0$), close northward of the intersection of the lines of the leading marks for Passo Interno and for the anchorage westward of Isola Serpenti.

There is sheltered anchorage for vessels of light or moderate draught, at either end of the bay, but in both these anchorages, a long swell generally sets in through the passes and over the shoals, and, as vessels swing broadside to the swell, rolling is a frequent occurrence. The best berths in both anchorages are in depths of from 20 to 24 feet ($6^{m}1$ to $7^{m}3$), sand and mud, and good holding ground; the southern anchorage is the better during the strength of the south-west monsoon, but it is not much frequented on account of its distance from the town of Chisimaio (*Lat. 0° 22′ S., Long. 42° 33′ E.*).

Directions.—Vessels approaching either of the navigable passes are advised to proceed along the line of the leading marks at some distance outside the Owen barrier, so as to observe the set of the current before actually entering the passes. Inside the Owen barrier, the current is at times as strong as outside, but at other times it slackens, and it is sometimes far from easy to keep a vessel exactly on the leading marks, although this is necessary if using Passo di Levante.

Charts 670, 848, 2952, 597, 748b, 2483.

Chart 1052, plan of Baia di Chisimaio.

Passo Nord.—Passo Nord is the channel now generally used and is the only channel available at night. Vessels from southward should steer northward well outside the Owen barrier until the southern Tomba islet bears 270°, when the latter islet may be steered for on that bearing until the beacons on the northern extremity of Isola Serpenti and Collina Rotonda are in line, bearing about 247°, when course should be altered on to this line.

Vessels from northward should approach steering on the above leading line, which leads straight in from seaward. When the southern Tomba islet bears 340°, course should be altered south-westward towards Isola Pescicani; caution is necessary as the current may be setting across the course.

When the beacons in the vicinity of Scoglio Pilone and the leading light-beacons on Collina Marca are about to come into line, course should be altered sharply northward, and these beacons and lights, in line bearing about 325°, should then be steered for, care being taken to keep exactly on this line which leads through Passo Interno. When the two leading light beacons, eastward of the town of Chisimaio, are in line bearing about 030°, course should be altered on to this line, which leads to the anchorage in the northern corner of the bay. Care must be taken to keep exactly on this alignment in order to avoid the 17-foot (5^m2) patch about 4 cables north-westward of Isolotto Favatu (*Lat. 0° 24′ S., Long. 42° 32′ E.*). In 1951, a dangerous wreck, no longer visible, lay on this leading line and could be passed on either side but, owing to off-lying wreckage, it was necessary to give it a berth of about one cable. In that year, on account of wreckage and submerged obstructions, it was inadvisable to anchor northward of a line joining Isola Serpenti light-structure and Scoglio Pilone; vessels anchoring farther northward were cautioned to sound around the area of swing of the vessel.

If proceeding to the anchorage in the south-western corner of the bay, follow the directions given above until Collina Rotonda leading beacons come into line, bearing about 269°, and keep them so; when the beacons at the head of the southern part of the bay are in line, bearing about 234°, steer for them on that bearing which leads to the anchorage.

Passo di Levante.—Vessels from southward or eastward intending to enter by Passo di Levante should steer to bring Collina Rotonda leading beacons into line, bearing about 269°, and keep them so, which leads through the pass in a least depth of about 30 feet (9^m1); great care must be taken to keep on this leading line on account of the shoaler depths a short distance on either side; when the leading light-beacons and beacons for Passo Interno come into line bearing about 325° proceed as directed above, if bound for the anchorage at the northern end of the bay; if bound for the anchorage at the southern end of the bay, continue to keep the beacons in line, bearing about 269°, until those at the head of the southern end of the bay come into line, bearing about 234°, when proceed as previously directed.

Port facilities.—**Piers.**—A concrete pier, 435 feet (132^m6) in length, is situated on the north-eastern side of the bay, eastward of the town; the remains of an old pier lie close westward. The concrete pier is equipped with double Decauville rail tracks and a small hand crane.

Charts 670, 848, 2952, 597, 748b, 2483.

Chart 1052, plan of Baia di Chisimaio.

A jetty about one cable in length, is situated on the south-western side of Isola Serpenti (*Lat. 0° 23′ S., Long. 42° 33′ E.*).

A small harbour motor tug of low power is available for towing lighters and assisting vessels to manœuvre; in addition, there is a motor launch suitable for the transport of stores, and an iron lighter and two wooden barges.

Provisions and a small quantity of water are available.

During the north-east monsoon, landing may be effected anywhere on the shore of the northern part of the bay; during the south-west monsoon, the best landing place in the northern part of the bay is at the pier, but there is, at times, such a short, heavy sea inside the bay, that landing is impossible.

Town.—The town of Chisimaio (*Lat. 0° 22′ S., Long. 42° 33′ E.*) is the administrative centre for the Giuba district, and is the residence of the High Commissioner.

In 1950, the population consisted of about 5,000 natives and about 50 Europeans.

There is a hospital, with accommodation for a few Europeans.

The climate is healthy, as is generally the case throughout the Giuba district and the fevers that are common in most tropical countries, are practically unknown at Chisimaio.

Chisimaio is the port for the rich Oltre Giuba (Trans-Juba) district, the principal exports being bananas, cotton, cattle and ivory, while the main imports are manufactured goods, rice, flour, salt and petroleum.

Communications.—There is regular communication by sea with Europe, South Africa and with ports on the east coast of Africa.

There is telephone connection with the town of Gobuin, *see* page 483.

There is a radio station at Chisimaio, *see* page 35.

Charts 670, 848, 2952, 597, 748b, 2483.

CHAPTER XII

FIUME GIUBA ENTRANCE TO RAS HAFUN

Chart 2952.

BENADIR COAST.—Currents.—That portion of the coast, about 280 miles in length, between the mouth of Fiume Giuba and Collina Murot, a hill on the coast about 15 miles south-south-westward of Itala, is known as the Benadir coast, as it contains the four so-called ports of Brava, Merca, Mogadiscio and Uarsciech ; the word *benadir* signifies ports.

Off the Benadir coast, the currents in the open sea run with the monsoons, but close inshore, within about one mile of the coast, the currents are either imperceptible or are weak and variable and depend on the tides or on the conformation of the coast. The point at which the normal currents are experienced is often indicated by a line of ripples or small breakers, which sometimes produce the effect of being near a bank.

Chart 670.

Fiume Giuba.—Light.—Entrance.—Depths.—Fiume Giuba or Mto Ya Vumba-Ganàna, enters the sea about 5 miles north-eastward of Murder hill, described on page 475. The river rises in the mountains of Abyssinia and flows southward to Dolo, where it receives Fiume Daua from westward, whence it continues in a generally southerly course of about 500 miles to the sea.

The village of Giumbo (*Lat. 0° 15′ S., Long. 42° 36′ E.*) is situated on its northern bank, about 3½ miles north-eastward of Murder hill and about one mile within the entrance, and contains two large white buildings and the Residency, which is also a white building ; Torre Perducchi, a white, square tower, standing on a sand dune about a quarter of a mile north-north-eastward of Giumbo, is visible from a distance of about 15 miles.

A light is exhibited, at an elevation of 121 feet ($36^{m}9$), from a black, square, masonry tower on a white base, 30 feet ($9^{m}1$) in height, situated at Giumbo.

The entrance points to Fiume Giuba are sand dunes, and, owing to the erosive action of the river current when the river is in flood, the position of its mouth and of the sandbanks in the vicinity, are constantly changing, and information obtained by examination becomes unreliable after a very short time.

In 1936, the entrance to the river was barred by an extensive sandbank, which dried about 3 feet ($0^{m}9$), on either side of which was a channel leading into the river ; the depths in these channels were irregular and less than 3 feet ($0^{m}9$).

Charts 848, 597, 748b, 2483.

Chart 670.

At the above date, entry was only possible during the moderate periods of the north-east monsoon, and then only at high water, to vessels of less than 3-foot (0^{m}9) draught. During the strength of the monsoons, the sea breaks for some distance outside the entrance, approach to which is dangerous, and the entrance is difficult to identify at these times.

Close within the entrance the depths increase, and there are depths of from 7 to 20 feet (2^{m}1 to 6^{m}1) for several miles above its mouth.

Anchorage.—Off the mouth of Fiume Giuba, the depths are very irregular and are subject to change, and the locality is exposed to the full force of both monsoons. Temporary anchorage may be obtained abreast the entrance, in depths of from 8¾ to 10 fathoms (16^{m}0 to 18^{m}3), about 1½ miles offshore.

Villages.—About half a mile westward of Giumbo and on the opposite bank of the river is the larger village of Gobuin; in 1936, the population of Gobuin was about 2,000, and of Giumbo, about 1,000. Gobuin is a place of growing importance and acts as a clearing station for trade on Fiume Giuba, goods being thence despatched to Chisimaio by road. There is a ferry service between Gobuin and Giumbo.

Chart 2952.

Fiume Giuba above Giumbo.—Fiume Giuba is navigable throughout the year by vessels of a length of 75 feet (22^{m}9), and a draught of 2¾ feet (0^{m}8), between Giumbo (*Lat. 0° 15′ S., Long. 42° 36′ E.*) and Ionte, a distance of about 12 miles by river, and from May to December, between Giumbo and the town of Bardera, about 294 miles above the entrance. Above Bardera, the river is only navigable with difficulty, even in native craft, as far as Lugh Ferrandi, where the rapids commence.

The volume of water brought down by the river is extremely variable, being dependent on the weather conditions in the Abyssinian tableland, and to a certain extent on the rainfall in the districts on either side of its banks. Low river generally lasts from December to March, the river beginning to rise in April and continuing in flood from May to December, during which latter period, there is an active traffic on the river.

Fiume Giuba is generally between 250 and 1,100 feet (76^{m}2 and 335^{m}3) in width, but in a few places, the width of the channel is reduced to about 150 feet (45^{m}7) by islands.

The current is strong throughout its extent, in some places attaining a rate of 7 knots and seldom falling below 3 knots.

The country through which the river flows is well populated, with large villages and extensive belts of cultivation. Below Bardera there is a belt of black, alluvial soil on both banks, which, being irrigated and liable to periodical inundation, may be compared in fertility to that of the Nile valley.

The climate is healthy especially during the period of high river.

Communications.—A service of power launches maintains regular communication between Giumbo and Bardera.

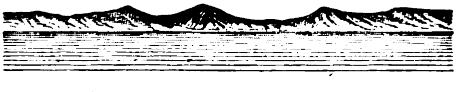
Coast.—Offshore depths.—Anchorages.—Between the entrance to Fiume Giuba and Isolotti Scillani, a group of islets, about half a mile offshore abreast the town of Brava, about 118 miles northeastward, the coast consists mainly of reddish sand dunes, sparsely covered with stunted bushes and backed by high sandhills, mostly

Charts 597, 748b, 2483.

Chart 2952.

bare, and is visible from a distance of about 25 miles. A high surf beats against the ledges which, in most parts, fringe the coast.

Conspicuous features on this stretch are few, but Sabda Badda, in the vicinity of the village of Oboie, situated on the coast about 87 miles north-eastward of the mouth of Fiume Giuba, may readily be identified. It consists of a saddle about one mile long, between two conical hills, with a black rock visible close inshore, about midway between them. There are several dark-red patches on the coastal hills, about 3 or 4 miles north-eastward of Sabda Badda.


Rock.
(Not shown in this view.)
Rock.

Sabda Badda from south-eastward.
(*Original dated* 1912.)

Two peaks, both rising conspicuously above the surrounding sandhills, are situated about 6 and 11½ miles, respectively, north-eastward of Oboie. The southernmost, which is the more conspicuous, lies about 1¾ miles inland and has two red patches close southward of it; the northern hill, which stands about one mile inland, is conical and resembles a crater.

This stretch of coast is thinly inhabited, but large herds of cattle may at times be seen on the coastal hills. In addition to Oboie, the principal villages on the coast are Macasi, about 57 miles north-eastward of the mouth of Fiume Giuba; Bardere, about 4 miles farther north-eastward; El Gaschera, about 19 miles north-eastward of Bardere; and El Baro (or El Daut), about 14 miles north-eastward of El Gaschera. El Gaschera is a large village, and, owing to its proximity to Sabda Badda, may be mistaken for Oboie, about 7 miles north-eastward, but a red patch, situated close northward of the former village, may assist in its identification.

This part of the coast has not been closely examined, especially the south-western part between the mouth of Fiume Giuba and Bardere; between Bardere and Isolotti Scillani, the coast may be approached with safety to within one mile in most parts, and off this stretch, depths of less than 25 fathoms ($45^{m}7$) extend from one mile to 1½ miles offshore. South-westward of Bardere (*Lat. 0° 29′ N., Long. 43° 20′ E.*), the offshore depths increase more gradually, and depths of less than 25 fathoms ($45^{m}7$), extend about 5 miles offshore abreast the mouth of Fiume Giuba.

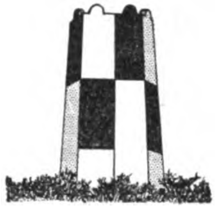
In 1873, H.M.S. *Daphne* reported depths of about 6 or 7 fathoms ($11^{m}0$ or $12^{m}8$), about 2 miles offshore between the mouth of Fiume Giuba and a position about 20 miles north-eastward, but depths of from 8 to 12 fathoms ($14^{m}6$ to $21^{m}9$) are shown in this locality on the Italian chart.

Anchorage may be obtained off Macasi, in depths of 12½ fathoms ($22^{m}9$), about 1¼ miles offshore; off Bardere in depths of from 5½ to 8¼ fathoms ($10^{m}1$ to $15^{m}1$) about half a mile offshore; and off El Baro, in depths of from 11 to 16 fathoms ($20^{m}1$ to $29^{m}3$), about half a mile offshore.

Charts 597, 748b, 2483.

Chart 671, plan of Brava anchorage.

Brava.—Islets and rocks.—Beacons.—Light.—Brava is a walled town, built on a plateau about 100 feet (30^{m}5) high, on the coast about half a mile north-westward of Isolotti Scillani. The land behind the town is high, has a reddish appearance and is dotted with dark clumps of brushwood. Two bare white hills stand, one on each side of the town, forming a contrast to the dark background ; the northern hill is the higher. The Residency, with a flagstaff, is situated near the coast about the centre of the town and is prominent as also is the Custom House, about one cable southward of the Residency, the radio mast, about 1½ cables westward of the Custom House, and the bastion towers of the town wall.



Brava rear leading beacon.
(*Original dated* 1941.)

A rectangular beacon, 34 feet (10^{m}4) in height and painted in black and white chequers, stands about 1¼ miles inland, on the summit of the highest hill behind the town, at an elevation of 564 feet (171^{m}9) (*Lat. 1° 07′ N., Long. 44° 01′ E.*).

Islotto Mnara, an islet, about 33 feet (10^{m}1) high, having on its summit a tower, 26 feet (7^{m}9) in height, is situated close offshore at the south-western end of Brava anchorage, about 1½ miles south-westward of Isolotti Scillani ; it stands out well against the white hill behind it and forms a good mark.

Scoglio Marghinisi are a chain of rocks, some of which are from 20 to 30 feet (6^{m}1 to 9^{m}1) high, which front the coast from about 5 cables north-north-eastward of Isolotto Mnara for about 8 cables north-eastward.

Isolotti Scillani consist of two islets, Scillani Sud and Scillani Nord, and several rocks, lying near the outer edge of a reef which projects from the coast abreast the town of Brava ; a pyramidal beacon, surmounted by a pole, stands on Isolotto Scillani Sud. Isolotto Scillani Nord is connected to the mainland by a wooden pier on piles. A rocky patch, awash, lies on the northern side of the pier, about 1¼ cables north-westward of Isolotto Scillani Nord.

Scoglio Mafacà, surmounted by a pyramidal beacon, lies about 4 cables westward of Isolotto Scillani Nord. A pyramidal beacon stands on this rock.

A light, known as Brava light, is exhibited, at an elevation of 173 feet (52^{m}7) from a white, pyramidal tower 67 feet (20^{m}4) in height, situated about one mile north-north-westward of Isolotto Scillani Nord.

Off-lying dangers.—Secca Elba, a shoal with a least depth of 7 feet (2^{m}1), is situated about 8 cables east-north-eastward of Isolotto Scillani Nord.

Two detached patches, with depths of 17 and 18 feet (5^{m}2 and 5^{m}5) over them, lie about 2 cables eastward and 1½ cables east-south-eastward, respectively, of Isolotto Scillani Nord (*Lat. 1° 06′ N., Long. 44° 02′ E.*).

Depths of less than 6 feet (1^{m}8) extend about 1½ cables north-eastward of Isolotto Scillani Nord, and nearly 2¼ cables north-north-eastward of that islet, there is a depth of 9 feet (2^{m}7).

Depths of 6 feet (1^{m}8) and less, extend about 2 cables south-westward of Isolotto Scillani Sud. Nearly 3½ cables south-westward of that islet, on the western side of the approach to the boat channel (page 486), there is a shoal with a depth of 6 feet (1^{m}8) over it.

Charts 2952, 597, 748b, 2483.

Chart 671, plan of Brava anchorage.

Current.—At the anchorage, the current sets along the coast either north-eastward or south-westward, with varying strength, according to the monsoon. The set is least felt at low water, and is at its maximum at high water, sometimes running at from 3 to 4 knots south-westwards; the north-easterly set is occasionally even stronger.

Anchorages.—The bank of soundings off Brava is distinctly marked by the change in the colour of the water, the deep ocean blue suddenly changing to green and closer inshore, changing again as suddenly, to dirty yellow.

The anchorages recommended during the north-east and south-west monsoons are indicated on the chart. During the north-east monsoon vessels should anchor on the alignment of the radio mast and the beacon, situated on the highest hill (*Lat. 1° 07′ N., Long. 44° 01′ E.*), situated behind the town, bearing 328°, in depths of from 8 to 10 fathoms ($14^{m}6$ to $18^{m}3$), sand and shells, with the tower on Isolotto Mnara bearing 246°. Better shelter, but at a greater distance from the port, may be obtained about half a mile south-westward of Isolotto Mnara. Small vessels may obtain sheltered anchorage, in depths of about 19 feet ($5^{m}8$), close westward of Isolotto Scillani Sud.

During the south-west monsoon the recommended anchorage lies on the alignment of Brava light, *see* page 485 and the rear beacon of the north-east monsoon anchorage, described above, bearing about 300°, with the beacon on Isolotto Scillani Sud bearing 226°. Small vessels may obtain anchorage farther inshore, about 4 cables north-north-eastward of Isolotti Scillani, in depths of from 22 to 24 feet ($6^{m}7$ to $7^{m}3$).

The holding ground is good at the outer southern anchorage, but is poor elsewhere.

Port facilities.—The pier connecting Isolotto Scillani Nord to the mainland is accessible to lighters and boats during either monsoon; there is a crane on the pier.

There are a few lighters at the port.

Landing may be effected at the pier, where there is a small landing jetty, or on the beach abreast the town. Landing on the beach is often difficult during the south-west monsoon; the usual landing place is near the Custom House and is approached through a boat passage between Scoglio Mafacà and the north-eastern end of Scogli Marghinisi.

Limited quantities of provisions may be obtained.

Town.—Brava is a well laid out town of pleasant appearance with fine avenues of palms, grassy squares and gardens. It is the exporting port for a large agricultural district, but, owing to the trade from the Giuba district being now diverted to Chisimaio, it has lost some of its former importance. The climate is said to be the healthiest in all Somalia.

There is a small hospital with a resident doctor.

In 1945, the population was about 9,000.

Exports consist mainly of leather goods and agricultural produce, and imports of manufactured goods, mostly cottons.

Communications.—There is regular communication by sea with Europe, South Africa, and with other ports in Somalia.

Chart 2952.

Brava to Merca.—Aspect.—Between Isolotti Scillani and Punta

Chart 2952.

Agarrè, a projection on the coast at the south-western end of Merca anchorage, about 55 miles north-eastward, the coast consists of a series of sandhills, from 260 to 330 feet ($79^{m}2$ to $100^{m}6$) high, and is destitute of trees, with a few rocks close offshore in places. About 8 miles north-eastward of Brava, the coastal hills commence to be dotted with stunted bushes, but they again become bare and sterile on approaching Punta Agarrè (*Lat. 1° 41′ N., Long. 44° 45′ E.*).

Coast.—Off-lying danger.—Anchorages.—Ras Dai is a rocky point which projects about half a mile from the adjacent coast, about 8 miles north-eastward of Isolotti Scillani; a reef, awash, extends for about half a cable north-eastward of its extreme and terminates in a rock, about 16 feet ($4^{m}9$) high.

On the northern side of Ras Dai is a bay which affords good anchorage for small vessels during the south-west monsoon, in depths of 2¼ fathoms ($4^{m}1$); there is no surf on the sandy beach at the head of this bay during the south-west monsoon, which makes it distinctive. Brackish water may be obtained from a well near the beach.

On the southern side of Ras Dai, the depths are too shoal to permit anchorage, even to small native craft.

Mamba Gasciera (Mwamba Gaschera), a reef, with rocks awash, on which the sea breaks, lies about 3 miles south-westward of Ras Dai, and about one mile offshore.

The coast between Secca Elba described on page 485, and Ras Dai, should not be approached within a depth of 20 fathoms ($36^{m}6$).

Ras Filfil (Punta Filfilli) is the extreme of an extensive, but only a slightly projecting, rocky headland, about 6 miles north-eastward of Ras Dai; Ras Sindassi, a more prominent point, also rocky, lies about 8 miles farther north-eastward, and may be identified by a large, white sand patch on a hill within it, which is noticeable. There is also a sand patch within Ras Filfil, larger but less prominent than that over Ras Sindassi, as the former patch is partly covered by brushwood.

El Torre is a compact village of huts situated on the coast close to a cliffy headland, about 5 miles north-eastward of Ras Sindassi; the village is partly hidden from seaward by the headland, but the latter may be readily identified by a large patch of red sand close northward, and a smaller patch of white sand close southward, while about one mile north-westward of the village, there is a reddish-coloured hill, sparsely covered with brushwood, with two conical summits, one of which rises well above the surrounding hills and is prominent. Other marks which assist in identification of the locality are, a large detached rock, close south-westward of the headland; a long chain of black rocks, about 30 feet ($9^{m}1$) high, on the beach, and a remarkable gap, shaped like a horseshoe, in the hillside at the northern end of the village.

Anchorage may be obtained, in depths of 8¼ fathoms ($15^{m}1$), about half a mile southward of the headland.

Between El Torre (*Lat. 1° 24′ N., Long. 44° 22′ E.*) and the village of Munghia, about 19 miles north-eastward, the coast is fringed in places by a detached reef, within which the sea is smooth, but the depths are apparently shoal. Munghia is a straggling village of huts, about 10 miles south-westward of Punta Agarrè and is only visible when close inshore.

Charts 597, 748b, 2483.

Chart 2952.

Temporary anchorage may be obtained southward of the village, in depths of 11 fathoms ($20^{m}1$), about half a mile offshore.

Current.—Although the current normally follows the direction of the coast, setting north-eastward or south-westward, according to the monsoon, a set towards the coast has occasionally been experienced, and vessels are advised to keep a good offing, especially at night, when proceeding along this coast. In December, 1876, H.M.S. *Diamond*, when hove to at some distance from the coast between Brava and Merca, experienced, during one night, a set of 36 miles 270°, or nearly directly onshore. At daybreak on this occasion, when about 5 or 6 miles from the coast, the current was observed to be setting 288° at a rate of 2 knots, and was apparently, as determined by a lead line, only a surface current. On nearing the coast, the set became more southerly and close inshore, would probably have been found to be south-westward, parallel with the coast.

Chart 671, plan of Merca anchorage.

Merca.—Aspect.—Offshore depths.—Merca is a large town, surrounded by a bastioned wall which gives it an imposing appearance; it stands on a small coral peninsula, of which Cabel Ras, the eastern extreme, lies about 2 miles north-eastward of Punta Agarrè. The town is backed by a range of hills, of which Gran Rabai, a conspicuous, reddish-coloured hill, about 6 cables northward of Cabel Ras, is the highest and is visible for a considerable distance. On the summit of Gran Rabai is a white look-out station, named Trevis fort, with a flagstaff standing at an elevation of 389 feet ($118^{m}6$).

At the foot of the hill are some scattered tombs, which have small cupolas like minarets, while on the summit of a ridge, 210 feet ($64^{m}0$) in height, about one mile south-westward of Gran Rabai is the Abdullah mosque (*Lat. 1° 43′ N., Long. 44° 45′ E.*).

Sheik Osman mosque.
(*Original dated* 1941.)

The Agarrè mosque, with a white minaret showing clearly between trees close within Punta Agarrè forms a good mark, and other good land marks are: Sheikh Osman mosque, with a dome painted in black and white horizontal bands, which stands alone, close westward of the town, about 4 cables westward of Cabel Ras; the Custom House, on the shore of the small bay westward of the Merca peninsula; and the rear leading light-structure (page 489), situated about one cable northward of Sheik Osman mosque. The ruins of Osman Gor mosque, situated about 8 cables north-eastward of Punta Agarrè, form a good mark for anchoring, but are not conspicuous on account of their dark walls.

With the exception of a narrow bight in the reefs close westward of the Merca peninsula, the coast between Punta Agarrè and Cabel Ras is fronted by reefs and foul ground which extend about 5 cables offshore.

Lights.—Beacons.—A light is exhibited, at an elevation of 39 feet ($11^{m}9$) from a pyramidal structure, painted in black and white vertical stripes 13 feet ($4^{m}0$) in height, situated on Punta Agarrè.

A light is exhibited, at an elevation of 30 feet ($9^{m}1$) from a white, square pyramid, situated a little over 1¼ miles south-westward of Punta Agarrè.

Charts 597, 748b, 2483.

Chart 671, plan of Merca anchorage.

Leading lights are established for the approach to the anchorage. The front light is exhibited, at an elevation of 26 feet ($7^{m}9$) from a white, concrete tower, with a balcony, 22 feet ($6^{m}7$) in height, situated behind Sheik Osman mosque. As the light-structure is partly hidden by the mosque, the upper part of the minaret of the latter, which is exactly in the line of the two lights, is painted in black and white horizontal bands. The rear light is exhibited, at an elevation of 116 feet ($35^{m}4$), from a concrete tower, painted in black and white horizontal bands, 52 feet ($15^{m}8$) in height, situated at the north-western angle of the town wall, nearly one cable north-north-westward of the front light. These lights in line, bearing 343°, lead towards the anchorage.

Merca rear leading light.
(Original dated 1941.)

A beacon, consisting of a truncated pyramid, painted in black and white chequers, the top of which is about 21 feet ($6^{m}4$) high, is situated about 700 feet ($213^{m}4$) southward of the rear leading light-structure. These two marks, in line bearing 355°, indicate the western edge of the foul ground, extending southward of the Merca peninsula, and assist boats approaching the landing pier (*Lat. 1° 43′ N., Long. 44° 46′ E.*).

Beacons, consisting of pillars, are erected in the following positions :—On Gran Rabai hill, alongside Trevis fort, and at an elevation of 330 feet ($100^{m}6$) ; on Todobatan, a 325-foot ($99^{m}1$) hill, situated about 8 cables south-westward of Abdullah mosque.

Current.—The current follows the general direction of the coast, setting north-eastward or south-westward according to the monsoon. The set is at its maximum at high water and at its minimum at low water. The current at times runs at from 3 to 4 knots.

Anchorage.—The anchorage is on the edge of the shore bank and is entirely exposed ; owing to the steepness of the bank, the space available for anchorage is narrow. The anchorage is considered to be one of the worst on this coast, but vessels, lying to two anchors with a good scope of cable, generally ride out even a hard south-west monsoon.

During the south-west monsoon, the best anchorage is in depths of about 12 fathoms ($21^{m}9$), with the rear leading light-structure and the beacon, situated about 1¼ cables southward of it, in line bearing 355°.

During the north-east monsoon, vessels are advised to anchor close eastward of the line of the leading lights for the anchorage, in depths of 12½ fathoms ($22^{m}9$). Another anchorage, also indicated on the chart, lies with the rear leading light-structure in line with Giama mosque, situated about 1½ cables south-south-eastward of it, bearing about 327°. Small craft may obtain partly-sheltered anchorage in the bight between the reefs, close south-westward of the Merca peninsula, in depths of from 7 to 21 feet ($2^{m}1$ to $6^{m}4$), but this anchorage is not available during the south-west monsoon.

Port facilities.—A wooden pier on iron piles, projects 550 feet ($167^{m}6$) from the beach, almost on the alignment of the beacon and the rear leading light-structure (*see* above). The pier is accessible to boats and lighters and there are two cranes on the head of the pier.

There are both motor and dumb lighters available at Merca.

Charts 2952, 597, 748b, 2483.

Chart 671, plan of Merca anchorage.

Fresh provisions are obtainable, especially meat, game, poultry, and eggs. Water is scarce and of inferior quality.

Town.—Merca is the capital of the Wadi Scebéli (Wadi Shebeli) district and is one of the most important centres of Somalia; the Commissioner for the district is resident. The houses are mostly built of stone; the Residency (*Lat. 1° 43′ N., Long. 44° 46′ E.*), a large, square building with a flagstaff, is situated at the western end of the town.

Merca is the port for a large agricultural district, and there is a large and developing export of bananas throughout the year; other exports include cotton, coffee, hides, etc. The principal imports are manufactured goods, chiefly cottons.

In 1951, the population was about 8,200, of whom 200 were Italians.

The climate is good and there is little variation in temperature throughout the year.

Communications.—There is regular communication by sea with Europe, South Africa, and other ports on the east coast of Africa.

Chart 2952.

Merca to Mogadiscio.—Aspect.—Between Cabel Ras and Ras Sif, a point at the south-western end of Mogadiscio anchorage, about 38 miles east-north-eastward, the sandhills which form the coast present an arid and desolate appearance, with a few islets and rocks close offshore in places. There are numerous villages along this coast, and, except off the village of Nimu, about 8 miles, and off Ras Aumachi about 14 miles, west-south-westward of Ras Sif, the coast may be approached within one mile in safety. Temporary anchorage may be obtained off several of the villages, but these anchorages are completely unsheltered.

Coast.—Anchorages.—Off-lying dangers.—Between Cabel Ras, described on page 488, and Ras Caf (Kaf), a conspicuous, rocky promontory, about 17 miles east-north-eastward, the coastal hills, especially those within 10 miles of Cabel Ras, present an irregular outline and are visible from a distance of about 15 miles.

Gilib is a large village, with, in 1936, a population of about 2,000, about 9 miles east-north-eastward of Cabel Ras; it stands on a rocky promontory, about 75 feet (22^{m}1) high, which, being joined to the mainland by a narrow isthmus, resembles an islet. In 1914, there was a prominent palm tree in the centre of the village.

Small quantities of provisions are obtainable from native traders; water from local wells is brackish.

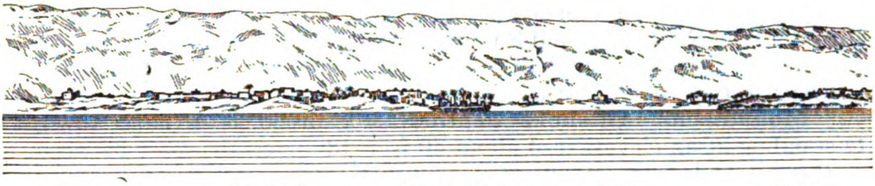
Anchorage, in depths of from 11 to 16½ fathoms (20^{m}1 to 30^{m}2), may be obtained abreast the village, about half a mile offshore.

Isolotto Bola Bola lies close offshore, about 1½ miles east-north-eastward of Gilib, and about 3 miles farther east-north-eastward is the noticeable village of Gonderscia, which contains numerous stone buildings. Oriale, another distinctive but smaller village, stands on an isolated sandhill about one mile east-north-eastward of Gonderscia, and is surrounded by palm groves. A solitary tomb is visible about midway between Gonderscia and Oriale, and there is another tomb close south-westward of Gonderscia, while Isolotto Au Garuin, an islet on which are some ruins, lies about one cable offshore between Gonderscia and Oriale. Scoglio Giamuini (*Lat. 1° 50′ N., Long.*

Charts 597, 748b, 2483.

Chart 2952.

45° 00′ E.), a large rock, lies close offshore about one mile east-north-eastward of Oriale and about 2 miles west-south-westward of Ras Caf.



Gonderscia and Oriale, distant 3 miles.

(*Original dated* 1902.)

The village of Danáne is situated about 1¼ miles north-eastward of Ras Caf and consists of numerous dark-coloured huts at the foot of a sandhill near the southern end of a bold, rocky point, about 50 feet ($15^{m}2$) high. The village is not easy to distinguish, on account of the dark colour of the huts, but two white tombs on the sandhill behind it, and several tracks, which stand out against the background, may be identified, while a flagstaff in the village, 33 feet ($10^{m}1$) in height, is prominent. Jacober, a village about 1½ miles westward of Danáne, may also be identified from seaward.

Anchorage may be obtained, in depths of 12½ fathoms ($22^{m}9$), about half a mile south-south-eastward of the village of Danáne; small vessels may anchor about 2 cables eastward of the village, in depths of 8¼ fathoms ($15^{m}1$), good holding ground.

Landing may be effected on a sandy beach on the southern side of the point on which the village stands; the beach is approached through a narrow break in the coral reef which fronts the coast between Ras Caf and Danáne and which extends about one cable offshore. Elsewhere, the coast is rocky and unapproachable.

Ras Bogol Tumin Afar, a point about 3 miles east-north-eastward of Danáne, has close within it, some wells which are noted for the purity of their water. A broad roadway, running directly inland from these wells, is visible from about 5 or 6 miles seaward.

Ras Aumachi, a rocky point about 5½ miles east-north-eastward of Danáne, may be identified by a dark-coloured mosque which stands on the point.

A 5½-fathom ($10^{m}1$) rocky patch, lies about three-quarters of a mile south-eastward of Ras Aumachi (*Lat. 1° 55′ N., Long. 45° 08′ E.*).

The village of Gesira stands on a rocky point about 4½ miles east-north-eastward of Ras Aumachi and may be identified by its white watch tower; Isolotto Anhansen lies close off-shore abreast the village.

Anchorage may be obtained, in depths of 11 fathoms ($20^{m}1$), about half a mile southward of Isolotto Anhansan.

The small village of Nimu, which is not easily distinguished from seaward, lies about 2 miles east-north-eastward of Gesira, in a small bight which is fronted by the rocky islet of Harim Omascia.

A line of breakers extending about a quarter of a mile offshore, was reported, in 1927, to fringe the coast from about 2 miles south-westward of Gesira to Ras Sif, and abreast Nimu, breakers were reported, in 1931, as much as one mile offshore.

Charts 597, 748b, 2483.

Chart 2952.

Ras Uerega lies about 7½ miles east-north-eastward of Gesira, and forms the end of a slight bight in the coast.

Anchorage may be obtained, in depths of 11 fathoms ($20^{m}1$) abreast Ras Uerega, about half a mile offshore.

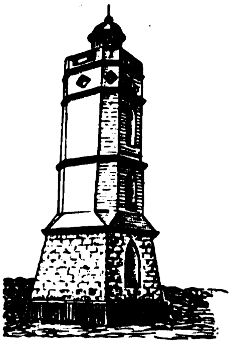
Between Ras Uerega and Ras Sif, about 2½ miles east-north-eastward, three small hills, about half a mile apart, may be seen on the coast.

Chart 671, plan of Mogadiscio.

Mogadiscio.—Offshore depths.—Mogadiscio is a large town, standing at an elevation of about 40 feet ($12^{m}2$), on the coast between Ras Sif and Torre Mnara (*Lat. 2° 02′ N., Long. 45° 21′ E.*), about 1½ miles north-eastward; its white, terraced buildings may be seen from a considerable distance in all directions. Torre Mnara, a dark-coloured tower, 80 feet ($24^{m}4$) high, stands about one cable within the coast eastward of the town and shows up well against a white sandy background; a conspicuous white, stone water-tower, with a domed roof, stands about 4½ cables north-eastward of Torre Mnara. Other prominent objects are the lighthouse, about one mile northward of Ras Sif; and the cathedral situated in the centre of the town about 5½ cables east-south-eastward of the lighthouse. The cathedral has twin, square towers, 136 feet ($41^{m}4$) in height, with a massive gilt cross on the wall between them, and is the most conspicuous object in the town.

Ras Sif is steep-to, but a bank on which the depths are less than 6 fathoms ($11^{m}0$), fronts the coast between Ras Sif and Torre Mnara and extends as much as half a mile offshore; eastward of Torre Mnara, the coast for about 1½ miles north-eastward is fronted by a chain of coral reefs, awash, which always breaks and which extends about 5 or 6 cables offshore.

During the south-west monsoon rough seas can be expected off this harbour, and between the end of May and September conditions are usually so bad as to render lightering impossible, heavy breakers being experienced between the roadstead and Porto Dau (page 493).



Mogadiscio lighthouse.
(*Original dated* 1936.)

Lights.—Mogadiscio light is exhibited, at an elevation of 246 feet ($75^{m}0$), from a white, masonry tower, 33 feet ($10^{m}1$) in height.

Leading light-beacons are established for the approach to the anchorage. The front light is exhibited, at an elevation of 121 feet ($36^{m}9$), from a white beacon with black bands, 52 feet ($15^{m}8$) in height, situated on Betel Ras fort, about 7 cables north-eastward of Ras Sif. The rear light is exhibited, at an elevation of 216 feet ($65^{m}8$), from a black and white chequered beacon, 30 feet ($9^{m}1$) in height, situated about one cable south-westward of Mogadiscio lighthouse and about 6 cables north-westward of the front light-structure. These lights in line, bearing 306½°, lead towards the anchorage.

A light is exhibited, at an elevation of 59 feet ($18^{m}0$), from an iron framework tower, 44 feet ($13^{m}4$) in height, situated on the roof of the Port Captain's office, about one cable south-south-eastward of Torre Mnara (*Lat. 2° 02′ N., Long. 45° 21′ E.*).

A light is exhibited, from a beacon, 30 feet ($9^{m}1$) in height, on the

Charts 597, 748b, 2483.

Chart 671, plan of Mogadiscio.

head of the breakwater, about 5 cables south-westward of Torre Mnara.

Signal station.—A signal station, with which vessels at the anchorage can communicate, is situated at the Port Captain's office, at which there is a flagstaff; constant watch is kept.

Current.—A current setting north-eastward nearly parallel with, but inclining slightly towards the coast, has been experienced off Mogadiscio in August. In the same month, a current setting 82 miles in 24 hours, in a direction about 045°, has been recorded. The south-westerly current usually reaches Mogadiscio about the second week in December. It is said that this current invariably begins to run with bad weather from the north-eastward. *See* also pages 26 and 482.

Anchorage.—Anchorage may be obtained, in depths of about 7 fathoms ($12^{m}8$), about 6 cables offshore, with the leading light-beacons in line, bearing 306½°, or farther in on the same alignment with Torre Mnara, bearing 036½°, where the depth is about 33 feet ($10^{m}1$). These anchorages are exposed but the holding ground is good; during the south-west monsoon, however, the state of the sea makes holding difficult and large vessels have been known to drag.

Harbours.—A harbour for the use of lighters and boats, has been formed by the erection of a breakwater, which projects from the coast close eastward of the Port Captain's office. The breakwater extends about 1½ cables in a southerly direction and thence about 4 cables west-south-westward, and the inner part consists of a pier built on dolphins, with boat passages between them. During the south-west monsoon the harbour is rendered almost unusable on account of the state of the sea.

A small natural harbour, known as Porto Dau, lies within the chain of reefs, awash, which fronts the coast eastward of Torre Mnara (*Lat. 2° 02′ N., Long. 45° 21′ E.*), in which local dhows and boats may obtain sheltered anchorage, in depths of from 3 to 10 feet ($0^{m}9$ to $3^{m}0$). Porto Dau is generally entered from westward between the dolphins of the inner part of the breakwater, as the eastern entrance is obstructed by numerous rocks, and should not be attempted without local knowledge.

There are numerous sunken rocks, both in Porto Dau and in the area enclosed by the breakwater.

Port facilities.—There are some piers between the Port Captain's office and the Custom House, about 2 cables westward; they are provided with cranes, of which the largest has a lifting capacity of 10 tons. There are no tugs, but two launches are available for carrying passengers or towing lighters.

Landing may be effected at the piers or at steps on the western side of the root of the breakwater.

There are a few lighters with loading capacity of 130 to 160 tons.

Fresh provisions are obtainable.

Water is available and is supplied to lighters by a hydrant on the breakwater jetty and thence transferred to shipping in the roads.

Town.—Mogadiscio, with the exception of Chisimaio, is the only port between Berbera and Mombasa. The residency is situated on a hill at the rear of the town. The town is divided into two distinct parts, Amariuni, the south-western part, is the older, and was originally a Portuguese settlement; at Scingani, the north-eastern part of the

Chart 671, plan of Mogadiscio.

town, a modern industrial town is rapidly replacing the former native village.

In 1952, the population was about 70,000, of whom 3,500 were Italians.

The exports, which are rapidly increasing, are mainly agricultural products, and the imports chiefly manufactured goods and building materials.

There is a hospital at Mogadiscio.

Communications.—There is regular communication by sea with Europe, South Africa, and other East African ports.

There is a radio station at Mogadiscio, *see* page 35.

Chart 2952.

Climatic table.—*See* page 80.

Mogadiscio to Uarsciech.—Coast.—Off-lying dangers.—Between Mogadiscio and Punta Rovine, a rocky point close southward of the village of Uarsciech, about 32 miles east-north-eastward, the coast consists generally of low, sandy desert backed by reddish-coloured hills dotted with scanty vegetation ; there are few projecting points, but for about 10 miles east-north-eastward of Mogadiscio, there are several small indentations which are backed with white sandhills.

Punta Avai (Havai) (*Lat. 2° 12′ N., Long. 45° 39′ E.*), a dark rocky point about 21 miles east-north-eastward of Mogadiscio, has on it the ruins of the former village of Avai, and from a distance, resembles an islet.

The coast in this vicinity is fronted in places by lines of black rocks.

A chain of rocky shoals and patches, known as Barra Cherso, with depths of from 1¼ to 5 fathoms ($2^{m}3$ to $9^{m}1$) over them, and greater depths between them, extends from one to 2 miles offshore along almost the whole extent of this stretch of coast.

The outer edge of the 50-fathom ($91^{m}4$) shore bank lies parallel with the coast from 2 to 2½ miles offshore ; within the bank, the depths in places decrease very rapidly, and the coast between Mogadiscio and Punta Rovine should therefore be given a wide berth.

Chart 671, plan of Uarsciech anchorage.

Secca Staffetta and Secca Uarsciech are the north-easternmost of the above chain of shoals. Secca Staffetta, with a least depth of 16 feet ($4^{m}9$) lies about 3 miles south-westward of Punta Rovine.

Secca Uarsciech, which is a continuation within the 5-fathom ($9^{m}1$) line of Secca Staffetta, extends north-eastward for about 4 miles from southward of Punta Rovine and lies parallel with the coast ; it has a least depth of 15 feet ($4^{m}6$) just under 2 miles south-eastward of Punta Rovine : shoal patches of 18 feet ($5^{m}5$) and less lie within one mile south-westward of the 15-foot ($4^{m}6$) patch.

Banco Uarsciech the south-western end of which lies about 2 miles southward of Punta Rovine, extends parallel with the coast for over 4 miles east-north-eastward, with depths of from 3 to 5 fathoms ($5^{m}5$ to $9^{m}1$).

Uarsciech anchorage.—Aspect.—The village of Uarsciech is situated close within the small rocky promontory of Punta Rovine on steeply rising ground, and in clear weather, is visible from a considerable distance.

Sifad Add, a very white sandy hill, 208 feet ($63^{m}4$) in height, the summit of which is covered with grass, stands about 1½ miles west-

Charts 597, 748b, 2483.

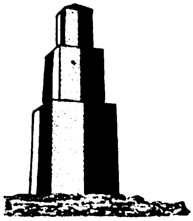
Chart 671, plan of Uarsciech anchorage.

north-westward of Punta Rovine and forms a good landmark, as also does a hill called Lama Gurgurud, meaning " Twins," on account of its twin summits, the higher of which stands at an elevation of 186 feet ($56^{m}7$), about 1¼ miles northward of Punta Rovine (*Lat. 2° 18′ N., Long. 45° 48′ E.*).

On a closer approach, Isolotto Piramide, a flat-topped islet, about 13 feet ($4^{m}0$) high, with steep sides, standing on a rocky reef, awash, which extends about 2 cables south-westward of Punta Rovine, may be identified; the islet stands out well, especially at high water when the reef is all covered.

Other prominent features are Buleder mosque, about 5 cables westward of Punta Rovine; a tower standing close within the extreme of Punta Rovine, and the Residency building, and flagstaff, with an elevation of 59 feet ($18^{m}0$), situated about one cable northward of Punta Rovine.

Beacons.—Leading beacons are established for approaching the anchorage. The front beacon is a pyramidal, stone pillar, standing on Isolotto Piramide; the rear beacon consists of a masonry tower, standing on the summit of Lama Gurgurud. These beacons in line, bearing 350°, lead over Barra Cherso between Secca Staffetta and Secca Uarsciech, passing near the south-western edge of the latter bank, in a least depth of 25 feet ($7^{m}6$).



Uarsciech rear leading beacon.

(*Original dated* 1941.)

There is a pillar on Buleder mosque.

Anchorages.—Directions.—Anchorage may be obtained, in depths of 15 fathoms ($27^{m}4$), sand and coral, good holding ground, with the beacons on Lamu Gurgurud and Isolotto Piramide in line, bearing 350°, and with Buleder mosque bearing 316°.

Small vessels may obtain anchorage, in depths of from 9 to 18 feet ($2^{m}7$ to $5^{m}5$), westward of Isolotto Piramide. Except during the south-west monsoon, this anchorage is completely sheltered by the reef extending south-westward of Punta Rovine.

Vessels of a draught of less than 25 feet ($7^{m}6$) may keep the leading beacons in line, bearing 350°, when passing between Secca Staffetta and Secca Uarsciech, but deep-draught vessels should keep the beacon on Lama Gurgurud bearing 355°, and well open westward of the beacon on Isolotto Piramide until within the banks.

Village.—The village of Uarsciech (*Lat. 2° 18′ N., Long. 45° 48′ E.*) has many times been destroyed in tribal warfare and rebuilt in a slightly different position, and the vicinity of Buleder mosque is covered with ruins and tombs. In 1936, the population was slightly less than 1,000.

A small amount of trade is carried by roads which connect Uarsciech to Mogadiscio and Itala, but there are no regular sea communications.

Limited amounts of fresh provisions, especially fresh meat and milk, are obtainable.

Chart 2952.

Uarsciech to Itala.—Coast.—Off-lying dangers.—From Punta Rovine, described on page 494, to Punta Uarsciech about 14 miles north-eastward, and thence to Ras Mallable, a rounded projection at the southern end of Itala roads, about 25 miles farther north-eastward,

Charts 597, 748b, 2483.

Chart 2952.

the coast is bare, desolate and hilly, and on the latter part of this stretch is fringed by reefs and shoals, which in places extend over one mile offshore.

Meruli wells are situated on the coast about 11 miles north-eastward of Punta Uarsciech, near a point northward of which the coast recedes somewhat. About 2 miles north-eastward of Meruli wells is Collina Murot, a hill which marks the northern termination of the Benadir coast. Viewed from southward, it appears as a small, regularly-shaped crater, with a dark rim, and is visible between sandhills which, in this vicinity, are very low; it is not so conspicuous when seen from northward, but its dark rim may be distinguished between the dunes at some distance from this direction. Several ranges of hills, rising in terraces, parallel with the coast, may be seen northward of Collina Murot.

A rocky bank, with depths of from 8 to 11 fathoms ($14^{m}6$ to $20^{m}1$), lies about 2 miles offshore, about 12 miles north-eastward of Punta Rovine.

A sunken reef, with depths of from 1½ to 5 fathoms ($2^{m}7$ to $9^{m}1$) over it, extends parallel with the coast for about 2½ miles, from a position about one mile south-eastward of Meruli wells.

Chart 2950, plan of Itala.

Itala roads.—Light.—Punta Itala is a projection on the coast about 3 miles north-eastward of Ras Mallable; it is formed of shifting sandhills and is fringed by a shoal which extends about 1½ miles south-eastward, under the lee of which, small vessels may obtain moderately sheltered anchorage, north-eastward or south-westward of Punta Itala, according to the monsoon.

The village of Itala is situated about 4 cables westward of Punta Itala; prominent features are the Residency, a large building, originally a castle, with a flagstaff, situated at the eastern end of the village, and a palm grove close northward of the village. In clear weather, Itala may be identified from a distance of about 12 miles from north-eastward.

A light (*Lat. 2° 45′ N., Long. 46° 20′ E.*) is exhibited at an elevation of 38 feet ($11^{m}6$) from a grey, iron framework structure, 4 feet ($1^{m}2$) in height, on the east gable of the Residency, about 3 cables west-south-westward of Punta Itala.

Dangers.—Beacons.—Numerous small rocks, on which the sea breaks heavily, lie within a distance of about 3 cables from the coast eastward and north-eastward of Ras Mallable, and a detached shoal, about one mile in extent, with a least depth of 23 feet ($7^{m}0$) over it, lies about one mile south-eastward of the same point.

Banco di Greco is an extensive bank, with depths of less than 3 fathoms ($5^{m}5$) over it, which extends south-eastward for about 1½ miles from Punta Itala; within the limits of this bank numerous rocks awash, over which the sea always breaks heavily, extend offshore for as much as 9 cables.

Secca Volturno is a rocky patch, with a depth of 10 feet ($3^{m}0$) over it, situated on the south-western side of Banco di Greco; Secca di Mezzo, with a least depth of 5 feet ($1^{m}5$) over it, lies on the north-eastern side of the bank. A detached 3-fathom ($5^{m}5$) rocky patch lies about 1½ miles eastward of Secca di Mezzo.

A shoal, with a depth of one foot ($0^{m}3$) over it, lies about 3½ miles east-north-eastward of Punta Itala.

Charts 2953, 597, 748b, 2483.

Chart 2950, plan of Itala.

The anchorage for large vessels during the north-east monsoon is marked by the intersection of the alignments of two pairs of leading beacons. The front beacon of the northern of these pairs consists of a pyramid, painted white, standing near the coast about 1¼ cables south-westward of the Residency; the rear beacon is a pyramid, painted in black and white horizontal bands, and stands on Bur el Harion, about 4 cables northward of the front beacon; these beacons are in line, bearing 357½°. The front beacon of the southern pair stands near the coast about 1½ miles south-westward of the Residency, and the rear beacon about 4½ cables north-westward of the front beacon. Both beacons are truncated pyramids, painted in black and white chequers and when in line, bear 308½°.

Bur el Harion beacon.
(*Original dated* 1941.)

The anchorage used during the south-west monsoon is also marked by a pair of leading beacons; the rear beacon of this pair is the pyramid standing on Bur el Harion; the front beacon, a pyramid, painted black with a white band, stands near the coast about 4½ cables east-north-eastward of the rear beacon; these beacons are in line, bearing 256½°.

Anchorages.—During the north-east monsoon, vessels of a draught of less than 20 feet ($6^{m}1$), may obtain sheltered anchorage westward of Secca Volturno, in depths of about 23 feet ($7^{m}0$), with the centre pair of leading beacons in line, bearing 357½°, about 8 cables from the front beacon. Large vessels may obtain anchorage, in depths of about 5 fathoms ($9^{m}1$), close westward of the intersection of the alignments of the centre and southern pairs of leading beacons, nearly 2 miles south-south-westward of Punta Itala (*Lat. 2° 45′ N., Long. 46° 20′ E.*).

During the south-west monsoon, the best anchorage berth is in depths of from 23 to 26 feet ($7^{m}0$ to $7^{m}9$), sand and coral, moderately good holding ground, on the alignment of the pair of leading beacons, which, in line bear 256½°, about 2½ cables north-north-eastward of Secca di Mezzo.

Village.—The village of Itala includes several stone houses and a mosque, and the palm grove behind it gives it the appearance of an oasis. In 1936, the population was about 500.

Provisions are scarce, and water from the local wells is somewhat brackish.

Quiet and safe landing may be effected abreast the village, during the north-east monsoon.

Communications.—There is regular communication by sea with other parts in Somalia.

Charts 2952, 2953.

ITALA TO RAS HAFUN.—Itala to Obbia.—Aspect.—Caution.—Between Itala and the town of Obbia, about 206 miles north-eastward, the coast is generally low and sandy, but a short distance inland, the dunes have a thin covering of grass, which when renewed by the inter-monsoon rains, resembles undulating prairie land. The monotonous aspect of this stretch of coast is broken by numerous white, shifting sandhills, formed of dry sand, which are known locally as "baad," and also by the occasional outcrop of

Charts 2952, 2953.

limestone rock, which occurs chiefly in the northern part of the stretch, in the vicinity of Obbia. In this latter vicinity, the tableland of Gouen is distinctive. It is situated about 16 miles within the coast in the vicinity of Obbia, attains an elevation of about 1,240 feet ($378^{m}0$) and is of a dark red colour; in clear weather it is visible from abreast Ras Assuad (*Lat. 4° 33′ N., Long. 48° 01′ E.*), about 57 miles south-westward of Obbia.

During the south-west monsoon, the visibility is often poor, and at times is reduced to a minimum by sand storms, which are especially prevalent off the coast for about 20 miles south-westward of Obbia.

Owing to the possibility of an on-shore set of the current during either monsoon, caution should be observed when approaching the coast, especially when in the vicinity of Secca Ternate and Daphne shoal (Secca Dafne), which are described below.

Coast. — Beacon. — Off-lying danger. — Between Punta Itala, described on page 496, and El Meghet, a small village on the coast about 42 miles north-eastward, the coast is low and is fringed by reefs which in places extend as much as 2 miles offshore. There are several wells of slightly brackish water at El Meghet.

A beacon, consisting of a wall, 16 feet ($4^{m}9$) in height, painted in black and white chequers, and surmounted by a small cone, stands at an elevation of 42 feet ($12^{m}8$), on the coast close to El Meghet.

Secca Ternate, a dangerous shoal, which breaks occasionally, lies about 3 miles offshore, about 5 miles east-north-eastward of El Meghet beacon; there are depths of over 16 fathoms ($29^{m}3$) close to the shoal.

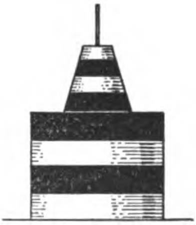
A shoal, with a depth of 4¼ fathoms ($7^{m}8$) over it, lies about 23 miles north-eastward of El Meghet beacon, and about 8 miles offshore.

Chart 2953.

Meregh.—Beacon.—Anchorage.—Meregh, a village on the coast about 42 miles north-eastward of El Meghet beacon, may readily be identified by Massaua beacon, described below, and by several whitewashed, stone buildings of which the northernmost is the Residency, with a flagstaff. Close within the village, a moderately large range of sandhills runs parallel with the coast, and during the rainy season, is covered with vegetation.

Limited supplies of certain provisions, including meat, are obtainable, and good water from local wells is fairly plentiful. In 1936, the population was about 200.

Massaua beacon, 22 feet ($6^{m}7$) in height, stands at an elevation of 98 feet ($29^{m}9$), on a dune about 2 cables westward of the Residency; it consists of a cylindrical pillar, surmounted by a truncated cone, and is painted in black and white horizontal bands.



Massaua beacon.
(*Original dated* 1936.)

Off Meregh, the depths decrease regularly from about 8 fathoms ($14^{m}6$) at 3 miles from the coast, to about 4½ fathoms ($8^{m}2$) at 7 cables offshore; the sea begins to break about a quarter of a mile offshore, and the beach being rather steep, landing is difficult and at times impossible.

The best anchorage berth is in depths of 5 fathoms ($9^{m}1$), sand, and fair holding ground; there is flat, rocky ground in places, which

Charts 597, 748b, 2483.

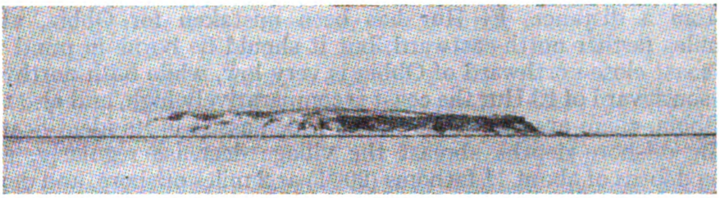
Chart 2953.

must be avoided when anchoring, but local pilots state that there are no off-lying dangers in the vicinity.

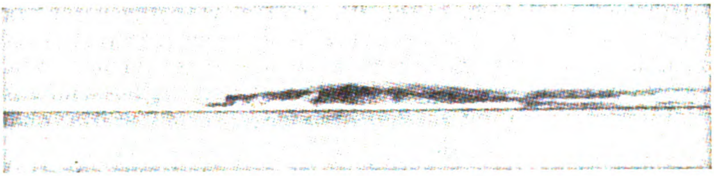
Coast.—Beacon.—Off-lying dangers.—Between Meregh and Ras Assuad, about 65 miles north-eastward, except in the Hocti Darute district, about 7 miles south-westward of Ras Assuad, the coast is generally low, and, with the exception of a noticeable sand-patch at Boholo, about 10 miles north-eastward of Meregh, there are no conspicuous features in the southern part of this stretch.

About 5 miles south-westward of Ras Assuad, there is a prominent rocky terrace, composed of limestone and clay, which extends about 3 miles south-westward, with an elevation of about 180 feet (54^{m}9), it is known as the Gallagois rock-terrace, and, as the adjacent coast is low, it resembles an islet when viewed from some distance seaward.

A beacon, 11 feet (3^{m}4) in height, consisting of a cylindircal, stone pillar, painted in black and white vertical stripes, with a white conical top, stands, at an elevation of 128 feet (39^{m}0) on the Gallagois rock-terrace, about 7 miles south-westward of Ras Assuad (*Lat. 4° 33′ N., Long. 48° 01′ E.*).



Ras Assuad from 6 miles south-eastward.



Ras Assuad from 7 miles north-eastward.

Between the Gallagois rock-terrace and Ras Assuad, the coast is low and sandy and there are numerous sandhills, held together by grassy vegetation, about one mile inland.

Daphne shoal, a rocky patch, the exact position of which is doubtful and which has not been closely examined, lies about 4 miles offshore, about 20 miles east-north-eastward of Massaua beacon ; it has a least known depth of 4 fathoms 3 feet (8^{m}2), and there are depths of from 4 to 9 fathoms (7^{m}3 to 16^{m}5) between the shoal and the coast.

A shoal, with a depth of 5$\frac{3}{4}$ fathoms (10^{m}5) over it, lies about 2 miles offshore, about 26 miles north-eastward of Massaua beacon.

Ras Assuad does not project from the adjoining coast line, but consists of a sheer cliff of black rock, 65 feet (19^{m}8) high, at a point where the coast makes a slight bend ; a small belt of sandhills, covered with thick grass, stands on Ras Assuad, on the highest point of which is a pillar (*Lat. 4° 33′ N., Long. 48° 01′ E.*) at an elevation of 111 feet (33^{m}8).

Charts 597, 748b, 2483.

Chart 2953.

Between Ras Assuad and the village of El Hur, about 31 miles north-eastward, the coast is generally low and sandy, but at Faddi Araule and Gal Uein, about 8 and 15 miles, respectively, north-eastward of Ras Assuad, there are raised rock-terraces, about 200 feet (61^{m}0) high, which, at a distance, resemble isolated hills.

El Hur.—Anchorage.—El Hur is a small fishing village, built on a sand hill, about 50 feet (15^{m}2) high, and contains a noticeable white, square house, in addition to a few huts and ruins. Supplies of meat, milk and fish may be obtained.

El Hur may be identified, especially when approaching from southward, by the reddish colour of the sand dunes behind the village; approaching from northward, the village is partly shut in by the coastal sandhills.

The bed of the Uadi Didinta, which is usually dry, may be seen among the dunes behind the village, and on a closer approach, the castle, a white, square house, with battlements painted in black and white, which is situated about one cable within the coast, may be identified, while in the village is a distinctive heap of lime, burnt in the local kilns.

From a distance, El Hur has been mistaken for Obbia, about 26 miles farther north-eastward, but it should be borne in mind that the coast close northward of Obbia is very low, while both northward and southward of El Hur the coast is comparatively high, and also that, at Obbia, there are two radio masts which assist in its identification.

The offshore depths abreast the village decrease regularly, there being depths of about 11 fathoms (20^{m}1) at 2 miles offshore, and depths of 5 fathoms (9^{m}1) at one mile from the coast. A good anchorage berth is in depths of about 5½ fathoms (10^{m}1), about one mile offshore, with the castle bearing 326°.

A detached coral reef, awash, lies parallel with the coast abreast the village, a short distance offshore, and within the reef is a boat channel, which affords smooth access to the beach in fine weather; with a heavy sea, the surf breaks over the reef, and landing is impossible.

Local dhows anchor off the northern entrance to the boat channel, in depths of 11 feet (3^{m}4).

According to an Italian report, there are dangerous shoals, lying a few cables offshore, in the vicinity of El Hur.

Coast.—Beacon.—Off-lying dangers.—Between El Hur (*Lat. 5° 00′ N., Long. 48° 16′ E.*) and Punta Diga, a projection abreast the town of Obbia, about 26 miles north-eastward, the coast is low and sandy, with occasional low, dark-coloured rocks close offshore, which stand out against the white beach. Two ranges of sandhills run parallel with this stretch, one close to the coast and the other about one mile inland; the inner range is from 65 to 100 feet (19^{m}8 to 30^{m}5) high, and is covered with short grass which gives it a darker appearance than the coastal range. Numerous small pillars, some painted white, others white with black bands, stand on the summits of these two ranges of sandhills.

The Gouen tableland, described on page 498, is clearly visible in fine weather and under its south-eastern slopes, a few miles inland, is a group of extremely white " baad," *see* page 497, which is visible on clear nights. Another group of low, elongated " baad " stands near the coast, close northward of El Hur, and a prominent, isolated

Charts 597, 748b, 2483.

Chart 2953.

" baad " is situated on the coast about 11 miles south-westward of Punta Diga.

A beacon, consisting of a white, stone pyramid, 10 feet ($3^{m}0$) in height, stands at an elevation of 78 feet ($23^{m}8$) on a sandhill one mile within the coast at Hen Daier, about 10 miles north-eastward of El Hur ; there is a broad light-coloured patch on the southern side of the sandhill, which may assist in identifying the beacon.

In 1934, a shoal, on which a vessel grounded, was reported to lie about 2 miles offshore, about 9 miles north-eastward of El Hur.

In 1926, a rock, with depths of less than 6 feet ($1^{m}8$) over it, was reported to lie about 3½ miles offshore, about 15 miles north-eastward of El Hur.

The exact positions of the above dangers have not been determined, and vessels should give a wide berth to their vicinity.

Chart 2950, plan of Obbia.

Obbia.—Light.—Beacon.—Obbia is a small town, situated on a large, open and undulating plain close westward of Punta Diga ; the plain is covered with small, isolated hills, which, after any rain, are quickly covered with vegetation.

The new quarter of the town consists of stone houses and lies midway between Punta Diga and a small sandhill, about 9 cables west-north-westward, on the summit of which stands the Residency, a very prominent, isolated building, with a flagstaff. Close northward of the Residency, two radio masts, 89 feet ($27^{m}1$) in height, stand at an elevation of 131 feet ($39^{m}3$), and form a good mark, which can be seen from a distance of about 18 miles in clear weather. A large sandhill, with three distinctive peaks, stands near the coast close southward of the town, *see* view facing page 502, and an old castle, about 2 cables north-westward of Punta Diga, is also noticeable.

A light is exhibited, at an elevation of 103 feet ($31^{m}4$), from a square hut, painted in black and white bands, standing on the north-eastern corner of the Residency roof.

A beacon stands close north-eastward of the new quarter of the town.

Off-lying dangers.—A bank on which the depths are less than 3 fathoms ($5^{m}5$) fringes Punta Diga (*Lat. 5° 21′ N., Long. 48° 32′ E.*) and the coast northward of it and extends over 4 cables offshore in places.

Some rocks awash, lie within about three-quarters of a cable north-westward of Punta Diga. Scoglio Sud, consisting of two rocks awash, lies on the edge of the above bank, about 3½ cables north-eastward of Punta Diga ; Scoglio Nord, an above-water rock, lies about 5 cables north-eastward of Punta Diga.

Two detached 6-fathom ($11^{m}0$) patches lie within one mile south-eastward of Punta Diga.

Current.—During the north-east monsoon, the southward-going current runs strongly.

Anchorages.—Landing.—The anchorage has good holding ground, but is entirely exposed, and with a fresh wind there is a heavy surf on the beach which is dangerous for boats. Two anchorages are indicated on the chart. The northern one lies close southward of the alignment of the beacon and the Residency flagstaff, which when in line, bear 275°, with Scoglio Nord bearing about 334°, where the depths are about 25 feet ($7^{m}6$) ; the southern anchorage lies with

Charts 597, 748b, 2483.

Chart 2950, plan of Obbia.

the Residency flagstaff bearing 289° and Scoglio Nord bearing 345°, in depths of about 31 feet ($9^{m}4$).

During the south-west monsoon, dhows find partial shelter in the bight northward of Punta Diga, within an imaginary line joining Punta Diga and Scoglio Nord, in depths of about one to 2 fathoms ($1^{m}8$ to $3^{m}7$).

The usual landing place is close under the lee of Punta Diga and is partly sheltered by that point, but landing is difficult during both monsoons, and, during the south-west monsoon, a short, confused sea is experienced in this corner of the bight. Boats approaching the landing place generally make use of a passage, about a quarter of a cable wide, between Punta Diga and the drying rocks close southward.

Town.—The town of Obbia formerly stood on the coast close westward of Punta Diga, but has now been rebuilt farther westward, and nothing is left of the old town except the Castle, which is now used as a native hospital, and the Custom House. In 1936, the population was about 2,000.

The principal industries are curing hides and fishing; imports are manufactured goods, mostly cottons.

There are some native cargo lighters at Obbia; cargo is landed on the beach.

Fresh meat may be obtained with previous notice.

Communications.—There is regular communication by sea with other ports in Somalia.

Chart 2953.

Coast.—Beacons.—Off-lying dangers.—Between Punta Diga, described on page 500, and Ras Auad, about 65 miles north-north-eastward, the coast is bare and is deprived of water during the greater part of the year. There are no coastal villages on this stretch and the only well at which good water may be obtained, is at Iddam, about 13 miles south-south-westward of Ras Auad.

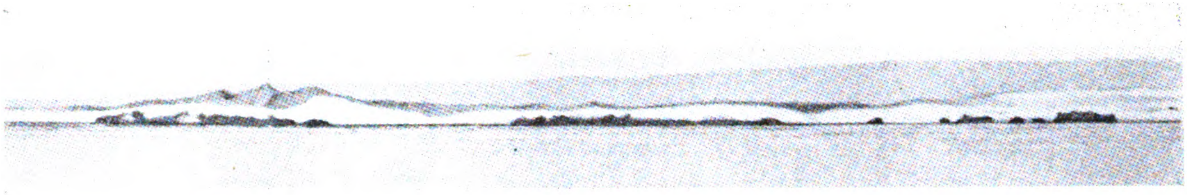
For about 15 miles north-north-eastward of Punta Diga, the coast consists of a broad, sandy beach, fringed with small rocks, awash, which extend about half a mile offshore, and backed by the sandy, undulating plain which surrounds Obbia. A prominent, large sandhill, showing patches and strata of rock, stands on the coast about 12 miles north-north-eastward of Punta Diga; its base is formed of dark rocks and there are low reefs extending both northward and southward of it. It is more noticeable when seen from northward. Depths of about 10 fathoms ($18^{m}3$), rock, have been reported as much as 2 miles offshore in this vicinity.

About 3 miles north-north-eastward of the above sandhill, the coast gradually rises in a double ridge of rock-terraces, from 130 to 170 feet ($39^{m}6$ to $51^{m}8$) high, and of a brick-red colour, which stretch along the coast for about 40 miles, when they terminate abruptly, and the coast thence is low, flat and sandy for about 6 miles north-north-eastward to Bur Gol (*Lat. 6° 15′ N., Long. 49° 04′ E.*), where it again rises in an isolated rock-terrace, which extends directly inland from the coast, and at a distance, resembles a promontory; this isolated rock-terrace has often been mistaken for Ras Auad, about 4 miles farther north-north-eastward.

A beacon, consisting of a masonry wall, 13 feet ($4^{m}0$) in height,

Charts 597, 748b, 2483.

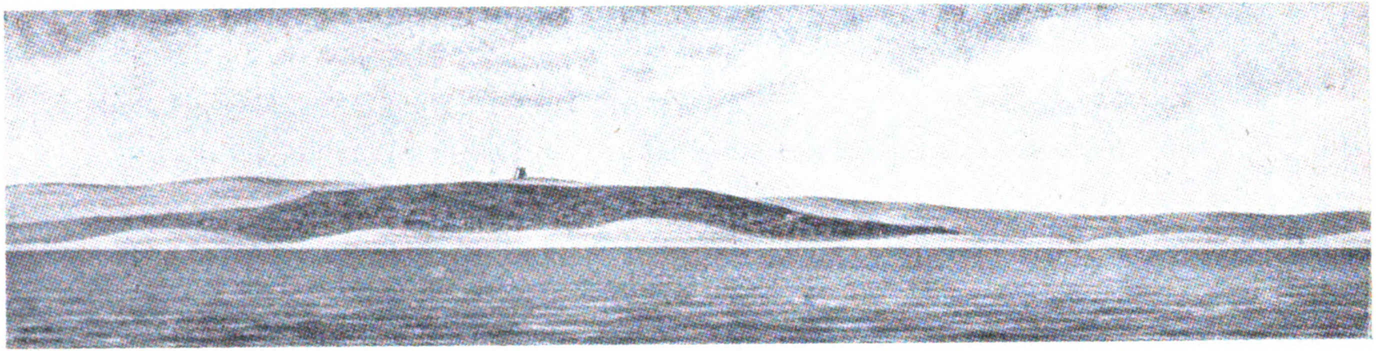
To face page 502.



Conspicuous sandhill.

View of coast close southward of Obbia.

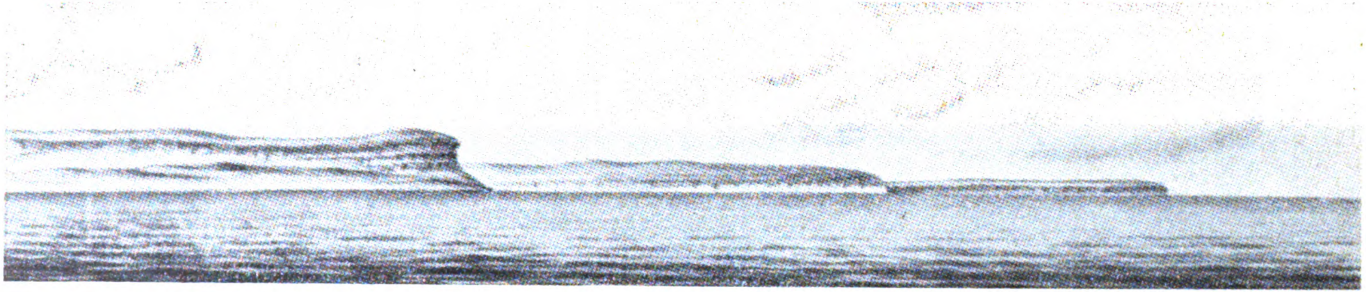
(*Original dated* 1936.)



Burgol beacon, bearing 300°, distant 5 miles.

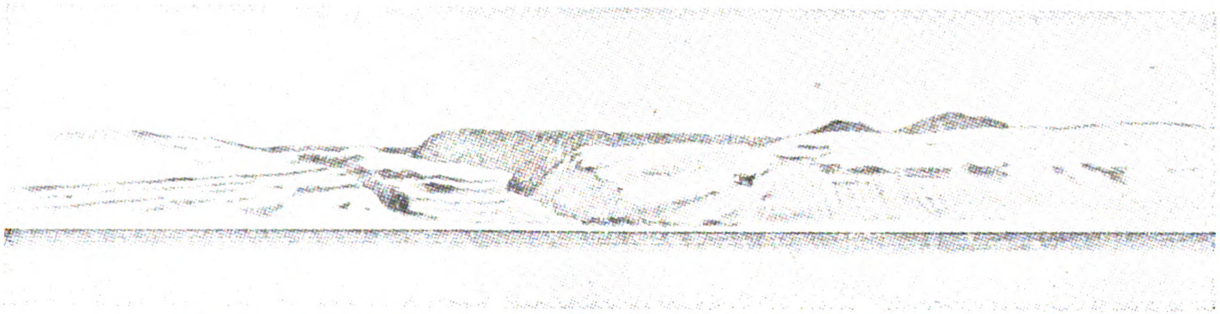
View of coast about 60 miles north-eastward of Obbia.

(*Original dated* 1936.)


Ras el Cheil.
Punta di Mezzo.
Ras Illigh.

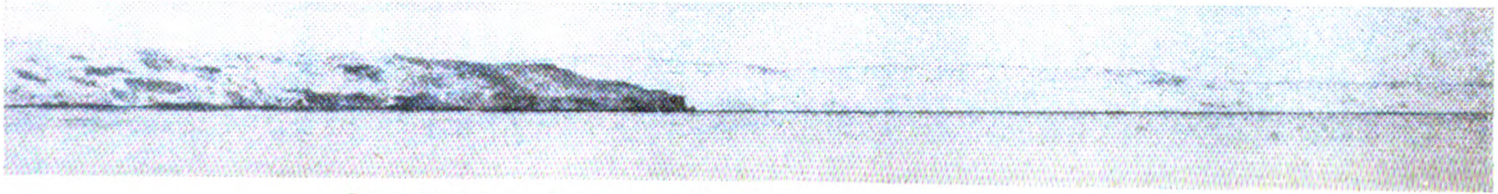
Ras el Cheil (bearing 287°), distant 10 miles.

(*Original dated* 1936.)



Mouth of Wadi Nogal from south-eastward, 5 miles.

(*Original dated* 1902.)



Ras Mabber from south-eastward, distant 5 miles.

(*Original dated* 1902.)

Chart 2953.

painted white with a black vertical stripe, stands at an elevation of 138 feet ($42^{m}0$) close within the coast at Calat, about 39 miles north-north-eastward of Punta Diga; viewed from seaward, it resembles a building, and in clear weather is visible for about 16 miles.

A beacon, consisting of a white, truncated masonry pyramid, 10 feet ($3^{m}1$) in height, stands at an elevation of 78 feet ($23^{m}8$) on the coast at Bur Gol; the terrace on which it stands is darker than the adjacent coast, and the beacon stands out prominently against a reddish-coloured background, especially when seen from northward. *See* view facing page 502.

In 1936, a 3¾-fathom ($6^{m}9$) shoal, the position of which is approximate, was reported about 4 miles eastward of Bur Gol beacon.

Ras Auad is a slight projection in the low, sandy coast, backed by gradually rising rocky ground; it is not distinctive from seaward. Close southward of Ras Auad, the coast forms a low, level terrace, which is white at the base and of a reddish colour above.

Between Ras Auad and Garàd, about 40 miles north-north-eastward, the coast is low, sandy and fringed by reefs in places, and backed by numerous sand dunes. This coast is known to the Arabs as " Sef Tweel " or " low shore," and landing on it is impossible.

A prominent cairn, known to the natives as Dinaùda stands on a coastal hillock, about 26 miles north-north-eastward of Ras Auad.

Garàd is a ruined fort, formerly a lookout post, but from seaward is only visible between the bearings of 335° and 005°; there are several wells of very brackish water at Garàd (*Lat. 6° 57′ N., Long. 49° 19′ E.*).

A beacon stands on the coast, close to and a little above, Garàd ruined fort.

Between Garàd and El Fosc, about 17 miles north-north-eastward, the coast consists of a sandy beach, occasionally fringed by reefs, and backed by a line of well-marked sand dunes, within which is a broad, flat plain.

Northward of El Fosc, the appearance of the coast changes, and it becomes bold and rugged. Between El Fosc and Ras el Cheil, about 40 miles north-north-eastward, two well-defined rocky ridges, about three-quarters of a mile apart, run nearly parallel with the coast, separated by a flat rocky terrace on which are occasional patches of grass.

Landing on this stretch of coast is impossible during most of the year, and as it is little known, it should not be approached within a distance of 5 miles.

Ras el Cheil is a rocky headland, about 475 feet ($144^{m}8$) high; it resembles a dome with terraces, and is more prominent than Punta di Mezzo and Ras Illigh, two other rocky points, situated about 2 and 4 miles, respectively, northward of Ras el Chèil. Ras Illigh is a sharp bold point, which rises to an elevation of 110 feet ($33^{m}5$); Punta di Mezzo attains an elevation of 200 feet ($61^{m}0$). *See* view facing this page.

A beacon, consisting of a white, square pillar, 7 feet ($2^{m}1$) in height, stands on the summit of Ras el Cheil.

Baía del Negro.—Baía del Negro is a slight bight in the coast between Ras Illigh and Ras Gabah, about 24 miles north-north-eastward. There are no known off-lying dangers in the bay, but a bank, on which the depths vary from 6½ to 19 fathoms ($11^{m}9$ to $34^{m}7$), is reported

Charts 1012, 597, 748b, 2483.

Chart 2953.

about 6 miles east-north-eastward of Ras Illigh. In addition to an open anchorage abreast Eil Marina (*Lat. 7° 58′ N., Long. 49° 51′ E.*), a village at the former mouth of Wadi Nogàl, about 9 miles northward of Ras Illigh, two other anchorages are available. During the south-west monsoon, partly sheltered anchorage may be obtained at the southern corner of the bay, about 2 miles north-north-westward of Ras Illigh. During the north-east monsoon, sheltered anchorage may be obtained off the mouth of Wadi Gabah, close south-westward of Ras Gabah (*Lat. 8° 09′ N., Long. 50° 03′ E.*).

Chart 2950, plan of Illigh.

Illigh anchorage.—Between Ras Illigh and the former mouth of Wadi Gululle, about 4 miles north-north-westward, the coast is bare and desolate; the village of Illigh, which in 1936, consisted of only a few native huts is situated close to a small point, about 1¾ miles north-westward of Ras Illigh.

A bank, with depths of less than 6 fathoms ($11^{m}0$) over it, extends about 9 cables north-north-eastward of Ras Illigh, and between the point and Illigh village the shore bank, with depths of less than 3 fathoms ($5^{m}5$) over it, extends about one mile seaward.

During the south-west monsoon, anchorage may be obtained, in depths of 5 or 6 fathoms ($9^{m}1$ or $11^{m}0$), good holding ground, with Ras Illigh bearing 172°, and the mouth of Wadi Gullule bearing about 324°, but the wind blows with considerable force at this anchorage, and the swell causes a vessel at anchor to roll heavily.

During the south-west monsoon, landing may be effected, without difficulty, in native surf boats on the beach abreast the village, but landing is difficult during the north-east monsoon, the best place being the entrance to Wadi Gullule (*Lat. 7° 51′ N., Long. 49° 48′ E.*).

Charts 2950, plan of Eil Marina, 2953.

Wadi Nogàl.—In 1940, the entrance to Wadi Nogàl had completely silted up but the former mouth of this river forms a deep hollow in the coastal hills which is most distinctive from south-eastward. At the former entrance is a reddish-coloured hummock with two yellow patches, which is backed by a round-topped hill. Vessels from southward may identify the former entrance when off Ras el Cheil, by the buildings in the village of Eil Marina, a village situated on the beach at the mouth of Wadi Nogàl. The former entrance is, however, not so readily identified by vessels from northward, as only the upper part of the cleft can be seen at a distance of about 8 miles. *See* view facing page 503.

Chart 2950, plan of Eil Marina.

The village of Eil Marina is the port for Eil, a town situated on the northern bank of Wadi Nogàl, about 3 miles above the former entrance and not visible from seaward. There is an Italian Resident at Eil. Prominent buildings in the village of Eil Marina are the Custom House, a white, square, isolated building, situated southward of the village; the mosque, a white, quadrangular-shaped building, with pinnacles at its four corners, situated in the northern part of the village, and a white barracks, easily identified by its verandah with pillars, standing near the cliffs a little northward of the mosque.

Anchorage.—Abreast Eil Marina, the offshore depths decrease regularly from about 39 feet ($11^{m}9$), about 8 cables offshore, to about about 18 feet ($5^{m}5$) about 2 cables offshore. A good anchorage berth

Charts 1012, 597, 748b, 2483.

Chart 2950, plan of Eil Marina.

is in depths of about 6 fathoms ($11^{m}0$), with the Custom House bearing 289°, about 9 cables offshore; the holding ground is good.

Landing is difficult, and native boats should be employed; in addition to a few native boats, there are some lighters at Eil Marina (*Lat. 7° 58′ N., Long. 49° 51′ E.*).

Supplies.—Fresh provisions are scarce, but a few head of cattle and limited supplies of groceries may be obtained.

Communications.—Except during the south-west monsoon, when communication is irregular, there is regular communication by sea between Eil Marina and other ports in Somalia.

Chart 2953.

Wadi Gabah.—Anchorage.—Between the former entrance to Wadi Nogàl and Ras Gabah, about 17 miles north-eastward, the coast consists of high cliffs of nearly uniform height, and, except for occasional gaps, is fronted by a white, sandy ridge of irregular height. About 11 miles south-westward of Ras Gabah there are three deep clefts in the coast, and close south-westward of Ras Gabah is the mouth of Wadi Gabah, which forms a large cleft in the precipitous cliffs at its entrance. A ruined castle, the former residence of the Mullah, stands on the steep northern bank of Wadi Gabah, a few miles within the entrance.

During the north-east monsoon, sheltered anchorage may be obtained close off the mouth of Wadi Gabah, in depths of about 8 fathoms ($14^{m}6$), and there is moderately good landing on the beach close under Ras Gabah.

Coast.—Beacons.—Off-lying dangers.—Between Ras Gabah and Ras Gurahane, about 5 miles north-eastward, the coast consists of a high wall of cliffs, from 250 to 300 feet ($76^{m}2$ to $91^{m}4$) high.

Between Ras Gurahane and Ras Mabber, about 88 miles north-north-eastward, the coast is rocky, bold and inaccessible, being from 250 to 400 feet ($76^{m}2$ to $121^{m}9$) high, and backed by a tableland furrowed by the beds of numerous water courses, mostly dry for the greater part of the year. The sea constantly breaks against the base of the cliffs, which are precipitous in places. This stretch of coast is known to the Arabs as " Hazine " or " rocky coast."

Between Ras Gurahane and Ras Garmàl, a large headland with precipitous cliffs, about 25 miles north-north-eastward, the cliffs are very indented and broken by clefts formed by water courses, and from Ras Garmàl to Ras Durdura, about 36 miles north-north-eastward, these clefts are very noticeable.

A beacon, consisting of a white, crenellated wall, 13 feet ($4^{m}0$) in height, stands, at an elevation of 325 feet ($99^{m}1$), at the edge of the cliffs on Ras Garmàl.

Between Ras Durdura and Ras Mabber, about 27 miles north-north-eastward, several sandhills are distinctive along the coast.

Ras Mabber is a prominent, rugged headland which is higher than the adjacent coast; it stands out conspicuously owing to its precipitous outer edge being covered with dark bushes. It is more noticeable from southward than from northward, but may be identified from about 7 or 8 miles in the latter direction. It rises precipitously from the sea for about 130 feet ($39^{m}6$), and thence slopes in a series of steep terraces which reach an elevation of about 387 feet ($118^{m}0$). *See* view facing page 503.

Charts 1012, 597, 748b, 2483.

Charts 2950, plan of Bandar Beila anchorage, 2953.

Ras Mabber is fronted by a reef on which the sea breaks and, between the point and the coast about 4 miles north-north-westward, the coastal bank, with depths of less than 3 fathoms ($5^{m}5$) over it, extends for as much as 4 cables offshore.

Depths of 6 fathoms ($11^{m}0$) are to be found about 2 miles north-north-eastward of Ras Mabber and, about 3½ miles north-north-eastward of the point there is a shoal, with depths of less than 6 fathoms ($11^{m}0$) over it, at the south-western end of which there is a least known depth of 25 feet ($7^{m}6$).

A rocky pillar stands near the coast about 7 cables southward of Ras Mabber (*Lat. 9° 28′ N., Long. 50° 51′ E.*).

A beacon, consisting of two superimposed white rectangular blocks, 7 feet ($2^{m}1$) in height, stands at an elevation of 453 feet ($138^{m}1$), at the edge of the highest of the steep terraces rising from Ras Mabber, and about 6 cables south-south-westward of the point; two other beacons stand at almost similar elevations between this beacon and Bender Beila village, 2 miles north-westward.

Chart 2953.

The coast between Ras Gabah (*Lat. 8° 09′ N., Long. 50° 03′ E.*) and Ras Mabber has not been closely examined, and depths of 22 and 24 feet ($6^{m}7$ and $7^{m}3$) have been found about 1½ miles offshore, about 7 and 21 miles, respectively, north-north-eastward of Ras Garmàl. The first-mentioned depth is known as Secca Burrasca.

In 1929, a shoal with a depth of less than 6 feet ($1^{m}8$) over it, the position of which is doubtful, was reported about 1½ miles offshore, about 12 miles north-north-eastward of Ras Garmàl, and, in the same year, a vessel of 24-foot ($7^{m}3$) draught, reported having touched a shoal patch about 6 miles offshore, about 16 miles north-north-eastward of Ras Garmàl.

Chart 2950, plan of Bandar Beila anchorage.

Bender Beila.—Bender Beila is a small village on the coast about 2 miles north-westward of Ras Mabber, the intervening coast being a tableland, about 650 feet ($198^{m}1$) high. The village stands on a strip of sandy beach at the foot of precipitous cliffs, and contains numerous stone buildings, mostly in ruins, as well as huts. A hill, about 230 feet ($70^{m}1$) high, with a ruin on its summit, and a low mosque, without minarets, at its base, stands in the centre of the village; southward of the hill and a little above the village, stands an isolated building, formerly the Residency, which is moderately prominent from seaward. Northward of the hill and near the end of the village, is a wooden building of a reddish colour.

Fresh provisions are very scarce; good water, from a local spring is plentiful.

There is occasional communication by sea with other ports in Somalia.

Anchorage.—During the south-west monsoon, anchorage may be obtained abreast the village, about 8 cables offshore, in depths of about 27 feet ($8^{m}2$), with a 453-foot ($138^{m}1$) beacon, situated about 4 cables south-westward of the village, bearing 243°, and the extremity of Ras Mabber, bearing 145°. Another anchorage is indicated on the chart, farther southward and inshore, in a depth of about 19 feet ($5^{m}8$), with a 446-foot ($135^{m}9$) beacon, situated about 8 cables south-south-eastward of the village, bearing 225°, and the extremity of Ras Mabber bearing 134°. Although moderately sheltered during the

Charts 1012, 597, 748b, 2483.

Chart 2950, plan of Bandar Beila anchorage.

south-west monsoon, there is a long swell at the anchorage, even when close inshore, and it is advisable to make use of native boats when landing on the beach.

Minerals in the composition of the rocks, are reported to cause discoloration of the water.

To vessels approaching from southward, the village is shut in by Ras Mabber when bearing more than 300°.

Charts 2954, 2953.

Coast.—Hafun peninsula.—Light.—From Bender Beila to Ras Gubba, a slightly projecting point about 31 miles northward and thence to the village of Ascira, about 22 miles farther northward, the coast is bold, rocky and precipitous, and for the last 20 miles is fringed with above-water rocks.

Abreast the village of Ascira, the coast trends eastward for about 16 miles and forms the southern side of a low, narrow isthmus of white sand, shells and mud, which connects the Hafun peninsula to the mainland.

Chart 2954.

Ras Hafun, situated about 68 miles north-north-eastward of Ras Mabber, is the eastern extreme of the Hafun peninsula, a peninsula formed of sandstone and limestone cliffs, which attain an elevation of from 400 to 600 feet ($121^{m}9$ to $182^{m}9$). The eastern end of the peninsula is quite flat and its interior consists of undulating hills, deeply intersected by ravines and water courses. Punta Dentino (*Lat. 10° 23′ N., Long. 51° 16′ E.*) the south-western extreme of the peninsula, about 9 miles west-south-westward of Ras Hafun, is high and flat and somewhat resembling a barn ; viewed from a distance, it appears separated from the peninsula, the intervening land being low.

The eastern and southern coasts of the peninsula are steep-to, depths of from 8 to 20 fathoms ($14^{m}6$ to $36^{m}6$) being found close to the cliffs between Ras Hafun and Punta Dentino.

There is a conspicuous, dark bluff about 3 miles southward of the north-western extremity of the peninsula.

Chart 2950, plans of Dante (Hafun) north and south anchorages.

On either side of the isthmus which connects the Hafun peninsula to the mainland, is a bay in which anchorage, sheltered according to the monsoon, may be obtained.

Chart 2954.

A light is exhibited, at an elevation of 351 feet ($107^{m}0$) from an iron framework structure on a small building 42 feet ($12^{m}8$) in height, situated near the extreme of Ras Hafun.

Off-lying shoal.—A shoal, with a depth of 10 fathoms ($18^{m}3$) over it, lies about 13½ miles east-north-eastward of Ras Hafun light-structure.

Chart 2950, plan of Dante (Hafun), south anchorage.

Dante.—Beacon.—The south anchorage of Dante (Hafun) is situated on the southern side of the isthmus between Punta Dentino and the village of Ascira, about 18 miles westward, but during the north-east monsoon, the wind blows across the isthmus and a cross swell rolls into the greater part of the bay, and sheltered anchorage is confined to the eastern corner of the bay, between Punta Dentino and the village of Dante (Hafun), about 2 miles northward.

Charts 1012, 597, 748b, 2483.

7. Every merchant vessel of and above 150 tons anchored or moored within the Dockyard Port shall have on board at least one person at all hours of the day and night.

8. If at any time the anchor of any merchant or other private vessel hooks any Government moorings, or any electric cables, or moorings of buoys, the master or other person having the charge or command of such vessel shall not proceed to unhook the same, but shall forthwith give notice thereof to the Senior Naval Officer in order that aid may be given for clearing such moorings or cables without doing damage to the same.

9. No merchant or other private vessel or boat shall, without license in writing from the Senior Naval Officer, be moored or fastened to any Government moorings, buoys, piles, or vessels in the Dockyard Port.

10. No ballast, stones, earth, clay, refuse, ashes, rubbish, dust, filth of any description, and no refuse from any quarry, mine, or pit shall be unladen, cast, or allowed to fall into the waters of the Dockyard Port, except in such places as are appointed by the Senior Naval Officer, or into or upon the banks, or any portion of the shore of the said Dockyard Port, or into or upon the shores of any rivers or streams discharging into the said Dockyard Port where the same may be liable to be washed into the waters of the Dockyard Port by rain, tide, or otherwise.

11. Nothing, however, in the foregoing provision shall be deemed to exclude such vessels as require admission to the town pier for loading and unloading cargoes; and all such vessels shall continue to enjoy their accustomed privileges in this respect as fully as if these regulations had not been made, provided they do not impede or interfere with the navigation of Her Majesty's vessels.

12. The master of every vessel to which these regulations relate shall observe and cause them to be observed so far as they relate to his vessel, and if any master or other person acts in any respect in contravention of any of these regulations, or fails to observe or cause to be observed, in any respect, any of them, he shall be liable on conviction to a penalty not exceeding £10, or to imprisonment with or without hard labour for a period not exceeding three months.

APPENDIX II

LIST OF PORTS AVAILABLE FOR UNDER-WATER REPAIRS, with Details of Largest Dry or Floating Dock or Patent Slip at each Port.

NAME OF PORT AND TYPE OF DOCK, ETC.	Length from bilge of Caisson or Mitre Post of gates at		Maximum length of keel blocks	Breadth of Entrance at		‡ Distance {below (+) above (−)} Chart datum level of			Springs rise	FLOATING DOCKS, PATENT SLIPS, &c.			REMARKS
	Coping head	Floor head		Coping	MHWS level	Sill	Blocks, at			Maximum depth over blocks		Lifting power	
							Entrance	Head		Forward	Aft		
	(1)*	(2)*	(3)	(4)†	(5)†	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
	Feet	Feet	Feet	Feet	Feet	Feet	Feet	Feet	Feet	Feet	Feet	Tons	
TABLE BAY:													
Sturrock dry dock .	§1212·4	§1208·9	1,110	148·0	146·3	+40·0	+40·0	+40·0	5·2	—	—	—	§ Caisson in outer stop. Floor of dock below sill at entrance is 4·5 feet. There are two intermediate caisson grooves giving the following dock lengths—outer 674·7 ft.; inner 472·4 ft., or outer 434·7 ft.; inner 712·4 ft.

---

* In the case of Floating Docks, Patent Slips, &c., column (1) = Extreme length; column (2) = Length on blocks or cradle.

† In the case of Floating Docks, column (4) = Breadth at top; column (5) = Breadth at bottom of dock.

‡ In order to find the depths on Sill, &c., the quantities in columns (6), (7) and (8) should be applied according to sign to the predicted or calculated height of tide as obtained from the Admiralty Tide Tables.

List of Ports available for Under-water Repairs, with Details of Largest Dry or Floating Dock or Patent Slip at each Port—*continued.*

NAME OF PORT AND TYPE OF DOCK, ETC.	Length from bilge of Caisson or Mitre Post of gates at		Maximum length of keel blocks	Breadth of Entrance at		‡ Distance {below (+) above (−)} Chart datum level of			Springs rise	FLOATING DOCKS, PATENT SLIPS, &c.			REMARKS
	Coping head	Floor head		Coping	MHWS level	Sill	Blocks, at			Maximum depth over blocks		Lifting power	
							Entrance	Head		Forward	Aft		
	(1)*	(2)*	(3)	(4)†	(5)†	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
	Feet	Feet	Feet	Feet	Feet	Feet	Feet	Feet	Feet	Feet	Feet	Tons	
Simons Bay: Selbourne dry dock	§779·8	§763·5	‖685	95·0	94·0	+30·4	+30·4	+29·4	5·5	—	—	—	§ Caisson in outer stop. ‖ Can be extended to 710 ft. Intermediate caisson allows dock lengths of— outer 494·25 ft.; inner 256·3 ft., or outer 344·25 ft.; inner 406·3 ft.
Mossel Bay: New slipway . .	360·0	92·0	—	—	28·0	—	—	—	6·5	8·5	13·5	250	
East London: Princess Elizabeth dry dock . . .	§686·4	§683·4	628·75	89·25	87·1	+28·0	+28·0	+28·0	—	—	—	—	§ Caisson in outer stop.

* In the case of Floating Docks, Patent Slips, &c., column (1) = Extreme length; column (2) = Length on blocks or cradle.

† In the case of Floating Docks, column (4) = Breadth at top; column (5) = Breadth at bottom of dock.

‡ In order to find the depths on Sill, &c., the quantities in columns (6), (7) and (8) should be applied according to sign to the predicted or calculated height of tide as obtained from the Admiralty Tide Tables.

List of Ports available for Under-water Repairs, with details of Largest Dry or Floating Dock or Patent Slip at each Port—*continued*.

NAME OF PORT AND TYPE OF DOCK, ETC.	Length from bilge of Caisson or Mitre Post of gates at		Maximum length of keel blocks	Breadth of Entrance at		‡ Distance below (+) / above (−) Chart datum level of			Springs rise	FLOATING DOCKS, PATENT SLIPS, &c.			REMARKS
	Coping head	Floor head		Coping	MHWS level	Sill	Blocks, at			Maximum depth over blocks		Lifting power	
							Entrance	Head		Forward	Aft		
	(1)*	(2)*	(3)	(4)†	(5)†	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
	Feet	Feet	Feet	Feet	Feet	Feet	Feet	Feet	Feet	Feet	Feet	Tons	
Durban: Prince Edward dry dock	§1207·0	§1190·7	1090	110·0	110·0	+35·0	+35·9	+34·2	5·9	—	—	—	§ Caisson in outer stop.
Lourenço Marques: Dry dock . . .	274·5	262·5	—	—	44·5	¶	¶	¶	11·4	—	—	—	¶ No information.
Beira: Dry dock . . .	95·0	95·0	85·0	24·0	24·0	—	—	—	20·9	—	—	—	Blocks arranged to suit vessel.
Zanzibar: Malindi slipway (East) . . .	238·0	59·0	—	18·0	—	—	—	—	12·75	6·0	7·5	50	
Mombasa: Mbaraki creek slipway	690·0	300·0 (max.)	—	48·0	—	—	—	—	11·2	11·0	20·5	2300	

---

* In the case of Floating Docks, Patent Slips, &c., column (1) = Extreme length; column (2) = Length on blocks or cradle.

† In the case of Floating Docks, column (4) = Breadth at top; column (5) = Breadth at bottom of dock.

‡ In order to find the depths on Sill, &c., the quantities in columns (6), (7) and (8) should be applied according to sign to the predicted or calculated height of tide as obtained from the Admiralty Tide Tables.

APPENDIX III

LIST OF PRINCIPAL PORTS, SHOWING PARTICULARS OF DEPTHS, ETC.

PORT	Depth below chart datum level		Rise of tide		REMARKS
	In channel of approach	In anchorage	Spgs.	Nps.	
			Feet	Feet	
Table Bay	Deep	4 to 8 fms.	5·2	3·8	
Victoria basin	36 feet	10 to 37 feet	—	—	
Alfred basin	20 feet	18 to 24 feet	—	—	
Duncan basin	39 feet	21 to 40 feet	—	—	
Simons Bay	Deep	4 to 10 fms.	5·5	3·7	
Basin	—	29 to 48 feet	—	—	
Mossel Bay	Deep	6 to 8 fms.	5·3	3·9	
Harbour	16 to 20 feet	4 to 11 feet	—	—	
Knysna	13½ feet	12 to 26 feet	5·0	3·3	
Port Elizabeth	33 feet	13 to 40 feet	5·8	4·2	
East London	35 feet	8 to 30 feet	5·6	3·8	
Durban	42 feet	20 to 40 feet	5·9	3·8	
Baía de Lourenço Marques	23 feet	27 to 48 feet	10·5	7·4	Depths on bar subject to change.
Lourenço Marques Harbour	24 feet	20 to 41 feet	11·4	7·9	
Gorjao quay	—	30 to 40 feet	—	—	
Baía de Inhambane	15 feet	24 to 32 feet	10·8	7·6	Depths on bar subject to change.
Pier	—	22 feet	—	—	
Porto da Beira	13 feet	18 to 40 feet	20·9	13·7	
Pungue wharf	—	30 feet	—	—	
Porto do Chinde	4 feet	15 to 24 feet	12·4	8·5	Depths on bar subject to change.
Quelimane	12 feet	12 to 20 feet	13·7	9·7	Depths on bar subject to change.
Porto de Antonio Enes	7 feet	22 to 23 feet	13·3	9·4	Depths on bar subject to change.
Porto de Moçambique:					
Canal do Norte	32½ feet	19 to 90 feet	13·1	9·1	
Canal do Sul	10 to 24 fms.	10 to 16 fms.	—	—	
Porto de Nacala	Deep	54 feet	12·1	8·3	
Porto Amelia	Deep	10 to 16 fms.	13·2	9·2	
Porto do Ibo	28 feet	37 to 48 feet	13·5	9·5	
Lindi Bay	Deep	5 to 8 fms.	—	—	
Mto Lukuledi	17 feet	7 to 10 fms.	9·7	6·7	
Kilwa Kivinje	Deep	4 to 6 fms.	12·0	7·8	
Dar es Salaam Bay	Deep	24 to 48 feet	—	—	
Harbour	22 feet	24 to 48 feet	10·3	6·8	
Zanzibar:					
Southern pass	6 fms	7 to 12 fms.	12·7	8·9	
English pass	6 fms.				
Chake Chake Bay	7 fms.	6 to 10 fms.	11·6	8·2	
Tanga Bay	Deep	4 to 10 fms.	13·2	9·1	
Inner harbour	37 feet	19 to 40 feet	—	—	
Port of Mombasa:					
Kilindini harbour	35 feet	11 to 15 fms.	11·2	7·9	
Mombasa Port	35 feet	46 to 84 feet	—	—	
Lamu Bay	5 fms.	30 to 33 feet	—	—	
Harbour	18 feet	20 to 24 feet	11·0	7·8	
Baia di Chisimaio:					
Paaso di Levante	29 feet	20 to 24 feet	7·4	4·8	
Passo Nord	Deep				
Passo Interno	30 feet				

APPENDIX IV

SPOTS SUITABLE FOR MAGNETIC OBSERVATIONS.

Reliable magnetic observations having been made at the following positions, the same places should be re-occupied, whenever practicable, in the event of further observations being required :—

Place.	Latitude and Longitude.	Position.
	° ′ ″	
DURBAN*	29 52 29 S. 31 03 28 E. (approx.)	On grass land on top of the Bluff, 10 paces eastward of edge, overlooking the city and harbour ; marked by bluish-black irregular stone 14 inches long, projecting 3 inches above surface of ground. Flagstaff near shore across bay, bearing 230° 09′. Flagstaff part-way up hill across bay, bearing 230° 13′. Post-office clock-tower bearing 301° 23′. Cupola of building on ridge, formerly Governor's house, bearing 323° 33′.
BEIRA*	19 50 42 S. 34 53 08 E.	Presumed re-occupation of Admiralty station of 1892 ; about 2 miles eastward of town, near coast, on crest of broken line of sand dunes about 165 yards south-westward of cable hut where cable is landed and carried overland to Beira, 110 paces southward of third pole of overhead cable line. Bottom of pole at cable-hut, bearing 055° 59′. Top of Ponta Macuti lighthouse, bearing 062° 50′. Southernmost visible telegraph pole on coast, bearing 271° 02′.
CHINDE*	18 34 10 S. 36 27 45 E. (approx.)	In space used as a garden within " Extra Concession," 25 paces south-westward of road which leads past British Concession to golf shelter at beach, opposite point in road 346 paces south-eastward of high fence of British Concession. Flagstaff at Portuguese Government office, about 440 yards, bearing 021° 29′. South verandah post of red-roofed bungalow, 0·54 miles, bearing 195° 37′. Eastern edge of British Consulate, about 440 yards, bearing 325° 04′.

* Position used by the Carnegie Institute of Washington, 1921.

Localities in which abnormal variation has been reported :—Baía de Lourenço Marques ; Baía di Chisimaio.

SPOTS SUITABLE FOR MAGNETIC OBSERVATIONS.—*continued.*

Place.	Latitude and Longitude.	Position.
	° ′ ″	
PORTO DE MOÇAMBIQUE* .	15 01 48 S. 40 44 45 E. (approx.)	In middle of rifle range, southward of south-western wing of Fortaleza de São Sebastião, 87 paces south-eastward of middle stone pillar of three at north-western end of range. Flagstaff on southern corner of fort, bearing 063° 54′. Top of Ilha de Gôa lighthouse, 2·7 miles, bearing 118° 01′. Cross of church on beach, 1·1 miles, bearing 217° 38′. Middle pillar at end of rifle range, bearing 318° 00′.
PORTO AMELIA*	12 58 00 S. 40 30 00 E. (approx.)	At western end of open sandy space which extends along hill-top between Government offices and military headquarters, 190 paces westward of western corner of platform of Governor's residence, exactly in line of fence along south-eastern side of fenced enclosure and 48 paces south-westward of stone at southern corner. Western end of roof of Governor's residence, bearing 111° 24′. Flagstaff at military headquarters, bearing 149° 25′. Flagstaff at office in town, 0·27 miles, bearing 264° 35′. Top of isolated peak in interior, 16·2 miles, bearing 286° 32′.
DAR ES SALAAM*	6 49 15 S. 39 17 50 E. (approx.)	On coast, eastward of Governor's palace, between main road along water-front and beach ; 136 feet northward of north-eastern corner of former magnetic observatory and 38 feet eastward of centre of main road. Marked by a stone block 6 by 6 by 18 inches, firmly embedded in a mass of coral rock and cement, the top face slightly above the level of the sand and lettered " C.I.W. 1921." Top of lighthouse tower, 2 miles, bearing 059° 21′. Easternmost point of land, 10 miles, bearing 089° 34′. Navigation mark on rock, 2 miles, bearing 094° 05′. Signal mast on pilot's house, half a mile, bearing 153° 52′.

* Position used by the Carnegie Institute of Washington, 1921.

Localities in which abnormal variation has been reported :—Baía de Lourenço Marques ; Baía di Chisimaio.

SPOTS SUITABLE FOR MAGNETIC OBSERVATIONS—*continued.*

Place.	Latitude and Longitude.				Position.
	°	′	″		
ZANZIBAR	6 39	10 11	06 10	S. E.	In west corner of Recreation park, 186 feet from Mnazimoja Road, measured at right angles from a point opposite the General Matthews memorial. 339 feet east-south-eastward of the south apex of the triangular enclosure around the memorial and 419 feet north-eastward of angle in cemetery wall; marked by a cement block 6 by 6 by 36 inches, its top face sunk one foot below the turf, a sink-hole indicating the exact spot. Bottom left side of Matthews memorial, bearing 108° 05′. Top of steeple of English cathedral, ¼ mile, bearing 182° 43′. Clock tower of Government stables, ¼ mile, bearing 185° 14′. Stack of destructor, ⅓ mile, bearing 199° 20′. Bottom of radio mast, ⅓ mile, bearing 199° 51′.
PEMBA (WETE HARBOUR) . .	5 39	03 42	56 24	S. E.	On a small island, situated 7 cables north-eastward of Ras Tungwi. Ras Gogoni, bearing 207° 21′. Ras Ukenjwi, bearing 290° 51′.
WASIN ISLAND . . .	4 39	39 21	18 46	S. E.	On the observation spot shown on Chart 866; a flat piece of ground at the north-western point of the island.
MOMBASA OLD PORT* . .	4 39	03 41 (approx.)	15 18	S. E.	On the eastern shore of Mombasa Old Port, near path leading east-north-eastward from steps at Ras Kidomoni, 27 paces beyond point where light railway crosses the path and 9 paces northward of the path; marked by a concrete block 12 inches square, standing about 2 feet above surface, the top face lettered "C.I.W. 1921." Top of Vasco da Gama monument, half a mile, bearing 208° 09′. Northernmost of two wireless masts, 2 miles, bearing 275° 13′. Ornamental urn on south-eastern corner of high school, bearing 313° 09′.

* Position used by the Carnegie Institute of Washington, 1921.

SPOTS SUITABLE FOR MAGNETIC OBSERVATIONS.—*continued.*

Place.	Latitude and Longitude.				Position.
	°	′	″		
MALINDI	3 40	13 07	00 41	S. E.	The beach in front of the I.B.E.A. Co.'s Superintendent's house. The summit of a hill, bearing 019° 39′. Vasco da Gama's pillar, bearing 140° 20′.
LAMU ISLAND, SHELLA .	2 40	18 54	00 56	S. E.	On the beach near the black beacon. The point situated midway between the battery and Ras Kitao, bearing 176° 46′ 29″. A clump, bearing 040° 21′ 29″. Shella flagstaff, bearing 010° 32′ 29″.
CHISIMAIO	0 42	22 33	09 08	S. E.	On the beach, about 200 yards eastward of the town gate. Favatu beacon, bearing 188° 24′. Scoglio Pilone, bearing 241° 29′. Fort flagstaff, bearing 313° 13′.
OBBIA	5 48	20 32	15 00	N. E.	On a sandy eminence about half a mile 315° 15′ from the Residency. South-western extreme of Sultan's house, bearing 145° 14′. South-western extreme of an isolated house, bearing 200° 39′.

INDEX

Page
Aasvogel point . . . 124, 125
Aasvogelberg 111
Abdullah mosque 488
Achumbu, Fungu 308
Acorn patch 247
Adamson bay 410
Add, Sifad 494
Afisi reef 330
Africa shoal 220
Afunji, Ras 299
Agarrè mosque 488
Agarrè, Punta . . . 487, 488
  Light 488
Ago, Scoglio 470
Aguada da Boa Paz 212
Agulhas :
  Bank 107
  Cape 106
    climatic table 65
    directions 107
    fog signal 107
    light 107
    life-saving 107
    signal station 107
  Current . . . 20–22
Air lights 30
Al, *see* proper name
Albatross rock 93
Alek, Mwamba 368
Alfred basin 88
Alfred, Port, *see* Port Alfred
Algoa :
  Bay 131
    winds 132
  Ponta 216
Aliwal shoal 176
  Beacons 176
  Current 176
  Directions 176
  Lights 176
Aliwal town 113
Alleyne, Mto 424
Almandia, Ponta 251
  Beacons 251
Almeida, Baía . . . 279, 280
  Anchorages 280
  Directions 280
Amahlongwana river 175
Amalulwana river 173
Amana reef, beacon 327
Amanzimtoti river 177
Amanzimtoti village 177
Amaruini 493

Page
Amatikulu bluff 187
Amatikulu river 187
Amatola range 141
Amboini hills 412
Ambu, Isola 474
Amelia, Porto . . . 281–284
  Anchorages . . . 282–283
  Depths 282
  Directions 283
  Lights 281
  Light-buoy 282
  Port facilities . . . 283, 284
Amendu point 160
Amendu river 160
Ancuasi, Ilha 271
Andromache reef 431
Angoche, Ilha de 256
Angoche, Ilhas de 256
Anhansan, Isolotto 491
Anole, Lac 473
António Énes, Porto de . . . 257–259
  Anchorages 258
  Aspect 257
  Beacon 258
  Buoyage 258
  Depths 258
  Directions . . . 258, 259
  Pilots 258
  Signal station 258
Anvil rock 94
Ariadne bank 376
  Light-buoy 376
Arimba, Portoda 284
  Anchorages 284
  Depths 285
Arletts hills 468
Arnold point 218
Ascira village 507
Assuad, Ras 498
Atlas reef 109
Atu, Mlima 315
Au Garuin, Isolotto 490
Auad, Ras 503
Aumachi, Ras 491
Avai, Punta 494
Aveu, Mwamba 309
Avvoltoio, Secca 476

Baakens river 138
Bagamoyo :
  Roadstead 363

Page

- Bagamoyo—Roadstead—*contd.*
    - anchorage . . . 364
    - buoy . . . 364
    - directions . . . 364
  - Town . . . 364
- Bagiuni, Isola dei . . . 467
- Baía, *see* proper name
- Bailey's Kop . . . 132
- Baixo, *see* proper name
- Bajone Ponta . . . 261
- Bak Oven bay . . . 90
- Bakke, Die . . . 113
- Bakkoven rock . . . 96
- Balozi spit . . . 324
  - Beacon . . . 324
- Banani, Ras . . . 399
- Banco, *see* proper name
- Banda reef . . . 332
- Bandaria ya Wali . . . 446
- Bander, *see* proper name
- Bangué, Ilha . . . 221
- Bangue reef . . . 290
- Baniana reef . . . 331
- Bantry bay . . . 90
- Banura, Ras . . . 315
- Barakuni island . . . 340
- Bardere village . . . 484
- Bardera town . . . 483
- Baro, El . . . 484
- Barra, Ponta da . . . 215
  - Light . . . 215
  - Signal station . . . 215
- Barra, Ponta da (R. Macuse) . . . 247
  - Beacon . . . 248
- Barra Falsa, Ponta da . . . 218
  - Current . . . 220
  - Directions . . . 220
  - Light . . . 219
- Barraco, Baixo . . . 253
- Barracouta, Cape . . . 111
- Barracouta channel . . . 463
- Barrow hill . . . 215
  - Beacon . . . 215
- Barrow point . . . 216
- Bartolomeu Dias, Porto . . . 223, 224
  - Anchorage . . . 224
  - Buoyage . . . 224
  - Pilots . . . 224
- Bartes bay . . . 129
- Barton reef, Miles . . . 110
- Barue rock . . . 396
- Basar, Rio . . . 242
- Bashee point . . . 161
  - Beacon . . . 161
  - Light . . . 161
- Bashee river . . . 160
  - Anchorage . . . 161
- Bathurst . . . 143
- Batja village . . . 336
- Batsata rock . . . 95
- Bawara reefs . . . 332
- Bawi island . . . 379
- Bawi, Mwamba . . . 379
- Bazar, Rio . . . 242
- Bazaruto, Baía de . . . 222
  - Anchorage . . . 223
  - Depths . . . 222, 223
  - Pilots . . . 222
- Bazaruto, Cabo . . . 221

Page

- Bazaruto Grande, Ilha . . . 222
  - Beacon . . . 222
  - Light . . . 222
- Bazarutos, Ilhas dos . . . 221
  - Currents . . . 221
- Beach Terminus village . . . 174
- Beacon islet . . . 122
  - Signal station . . . 123
- Beacon point . . . 132
- Beaufort, Port, *see* Port Beaufort
- Beaver Port, *see* Port Beaver
- Bedford bank . . . 374
- Bee islet . . . 420
- Begha river . . . 147
- Beila, Bender . . . 506
  - Anchorage . . . 506
- Beira, Porto da . . . 228–232
  - Anchorages . . . 230
  - Buoyage . . . 228, 229
  - Climatic table . . . 72
  - Depths . . . 228
  - Directions . . . 231
  - Dry dock . . . 231
  - Lights . . . 228, 229
  - Pilots . . . 229
  - Port facilities . . . 231
  - Radio station . . . 232
  - Signal station . . . 228
  - Tidal streams . . . 231
- Belami reef . . . 341
- Belan, Ponta . . . 216
- Belaso canal . . . 454
- Bellows rock . . . 94
- Belmore, Porto de . . . 275, 276
  - Anchorage . . . 276
  - Beacons . . . 275
  - Tidal streams . . . 276
- Belo Monte . . . 210
  - Beacon . . . 211
  - Light . . . 210
- Belvidere . . . 121
- Benadir coast, currents . . . 482
- Bender, *see* proper name
- Bengadini, Isola . . . 473
- Bengo, Baía . . . 274
- Benguerua, Ilha . . . 221
- Berea hills . . . 178
- Berikiti, Ras . . . 320
- Best cove . . . 118
- Bet-el-Ras . . . 385
  - Lights . . . 386
- Betel Ras, light . . . 492
- Binga hill . . . 345
- Bird island . . . 134
- Bird Island passage . . . 135
  - Directions . . . 136
- Bird islands . . . 134
  - Anchorage . . . 135
  - Current . . . 135
  - Light . . . 134
  - Tidal streams . . . 135
- Birkenhead rock . . . 104
- Bismarck hill . . . 309
- Bisserton hill . . . 149
- Blaauwberg . . . 83
- Blaauwberg point . . . 93
- Blaauwbergstrand village . . . 84
- Black bluff, light . . . 199
- Black rocks (Kowie R.) . . . 143, 145

Page
Black rocks (Bird Islands) . . . 134
Black rocks (Knysna) . . . 118
Black Cliff point . . . 429
Black Pudding hill . . . 165
Blankett Knoll . . . 477
Blinder rock (C. Infanta) . . . 110
Blinder rock (C. St. Blaize) . . . 112
Blinder reef, Outer . . . 108
Blockhouse point (Hout B.) . . 92
Blowing point . . . 444
Blue Rock river . . . 124
Bluff, The . . . 177
  Life-saving . . . 177
  Lights . . . 177
  Signal station . . . 177
  Wharfage . . . 182
    depths . . . 182
Bluff point . . . 167
Bluff point, First . . . 235
Boa Paz, Aguada da . . . 212
Boa Paz, Baixos da . . . 212
Bobare, Ras . . . 320
Bôca, *see* proper name
Bocage, Porto de . . . 277
  Anchorage . . . 277
Bocage, Vila . . . 239
Bodiam village . . . 148
Boéne, Ilha . . . 226
Boéne, Porto . . . 226
Bofu, Ras . . . 432
Bogol Tumin Afar, Ras . . . 491
Boholò . . . 449
Bokness hill . . . 142
Bokness river . . . 141
Bola Bola, Isolotto . . . 490
Bolegha river . . . 154
Boma peninsula . . . 420
Boma reef . . . 421
Bomoo river . . . 163
Bonambi mission station . . . 189
Bondei mountains . . . 412
Bongoyo island . . . 354, 360
Bongwe village . . . 330
Bons Sinais, Rio dos . . . 243–246
  Anchorage . . . 243
  Beacons . . . 244
  Buoyage . . . 244
  Current . . . 263
  Depths . . . 244, 245
  Directions . . . 245
  Pilots . . . 244
  Port facilities . . . 246
  Radio station . . . 246
  Tidal streams . . . 245
Boribu reef . . . 376
Bosa village . . . 346
Boschoek hill . . . 132
Bot river . . . 103
Boteler:
  Bank . . . 466
  Ledge . . . 466
  Point . . . 194
Botelho, Monte . . . 196
Botha kop . . . 129
Bower, Baixo . . . 294
  Buoy . . . 296
Bowker's bay, anchorage . . . 158
Bowker's bluff . . . 158
Boydu island . . . 341, 342

Page
Brak river, Great . . . 116
Brak river, Little . . . 116
Brak river hill . . . 124
Brakkefontein hill . . . 116
Brava:
  Anchorages . . . 486
  Beacons . . . 485
  Current . . . 486
  Light . . . 485
  Port facilities . . . 485
  Town . . . 486
Brazen head . . . 165
Breakwater sandbank, North . 225
Breakwater shoal, South . . 225
Bree river . . . 110
Brenton rock . . . 133
Brisk bank . . . 247
British Consular officers . . 31
Briton shoal . . . 370
Browne's bank . . . 107
Brugi, Baixos do . . . 261
Bububu house . . . 285, 386
Buchanan rock . . . 436
  Light . . . 437
Bueni, Ras . . . 341
Bueni village . . . 341
Buffalo bay . . . 117
Buffalo river (E. London) . . 150
Buffalo river (Algoa bay) . . 136
Buffel Jacht berg . . . 104
Buffel's bay (Cape point) . . 94
Buffel's bay (False bay) . . 95
  Beacons . . . 90
Buffel's kop . . . 111
Buffelsfontein hill . . . 129
Buiuni, Mwamba . . . 367
Buiuni village . . . 367
Buiuni Mdogo reef . . . 367
Buleder mosque . . . 495
Bull point . . . 111
Bulldog reef . . . 108
Bulungula river . . . 162
Bulura river . . . 155
Bumba branch . . . 334
Bundani, Ras . . . 405
Bunjuu reef . . . 424
Buoyage systems . . . 31–39
Bur el Harion beacon . . . 497
Burgal:
  Penisola di . . . 472
  Ras . . . 472
Burgao:
  Fiume . . . 469–472
    anchorage . . . 471
    aspect . . . 469
    beacons . . . 471
    depths . . . 470
    directions . . . 471
    tidal streams . . . 471
  Village . . . 472
Burgol beacon . . . 503
Burrasca, Secca . . . 506
Busci-Busci, Fiume . . . 469, 479
Busci-Busci village . . . 472
Bushman's river . . . 142
Bushy beach . . . 129
Bussard reef . . . 347

Page
Buuni bay 347
  Anchorage 348
  Directions 348
Buyu, Ras 375
Búzi Rio 227
  Light-buoys 227
Buzio, Ilha de 257
Bwamkuro, Mto 330
Bwamkuro, Ras 320
Bwechano, Ras 381
Bweni bluff 369
Bweni, Ras 373
Bweni village 371

Cabaceira beacon 265
Cabaceira, Cabo da 263
Cabaceira, Ponta da 265
Cabel, Ras 488
Cabo, *see* proper name
Cacoane, Banco de Ponta . . 251
Caf, Ras 490
Calajulo, Ponta 262
Calat beacon 502
Caldeira, Ilha 256
  Anchorage 257
Caldeira, Ponta 255
  Light 255
Calombo creek 265
Camel rock 284
Camelo, Pedra 284
Camps bay 90
Canal, *see* proper name
Canale, *see* proper name
Canoe point 311
  Buoys 311
Cannon bay 130
Cannon rocks 142
Cape of Good Hope 93
  Directions 95
  Life-saving 94
  Lights 94
  Radio beacon. 94
  Signal station 94
Cape of Good Hope Province :
  Flora and fauna 5
  General remarks 3–4
  Natives. 2
  Physical features 4
  Trade and produce 5
Cape peninsula :
  Aspect 81
  Eastern side 95
  Local magnetic anomaly . . 82
  Western side 90
Cape point :
  Aspect 94
  Life-saving 94
  Lights 94
  Radiobeacon 94
  Signal station 94
Cape Town :
  Climatic table 64
  Life-saving 90
  Port facilities. . . . 89, 90
  Radio station. 90
  Signal station 87
Capitania, Baixo 201

Page
Capo, *see* proper name
Carlos, Ponta de 222
Casa Hollandesa 217
  Anchorage 217
Castello, Punta 467, 468
Castle islet 325
Castle point (Buffalo R.) . . 149
Castle rock 96
Castor rock, buoy . . . 99, 100
Casuarina, Ilha 253
Casuarina road 253
  Anchorage 253
  Current 253
  Directions 253
Catembe 204
  Beacons 205
  Lights 204
Cavallos Marinhos, Banco dos . 244
Cavallos Marinhos, Ilha dos . 244
Cave rock 177
Cayman river 116
Cebe river. 158
Centre shoal 356
Cha, Mwamba 425
Chai-Chai, Ponta 210
Chaimite, Baixo 208
Chaka Mzungu islet 464
Chake Chake :
  Bay 398
    anchorages 400
    beacons 399
    buoys 400
    depths 399
    directions 400, 401
  Inlet 399
  Town 401
Chale island, light 428
Chale point 428
Chale reef. 428
Chalumna hill 148
Chalumna river 148
Chaluquene, Ponta 207
Chambure, Ponta 219
Chango island 385
  Beacons 386
Chaonde 279
  Light 280
  Military station 279
Chapani island 386
  Light-buoy 386
Chapel rock 459
  Beacon 459
Chapman, Baixo 293
Chapman's bay 92
Chapman's peak 92
Chapman's point 92
Charl Malan quay 137
Charra Village 454
Chataputa, Baixo 261
Chawamba, Fungu 378
Cheil, Ras el, beacon . . . 503
Chelsea point 130
Chemucane, Ponta 195
Chepuala beacon 213
Cherso, Barra 494
Chete Chete Isolotti . . . 470
Chiambone, Ras . . . 11, 468
Chibobar village 283
Chica, Canal da 242

Page

- Chicoa . . . 239
- Chicoma, Ponta . . . 270
- Chicuque, Ponta . . . 217
- Chidei, Mlima . . . 470
- Chiembo, Porto . . . 469
- Chiembo, Punta . . . 470
- Chikoma, Ponta . . . 270
- Chikuenine hill . . . 220
  - Beacon . . . 220
- Chiloane, Ilha . . . 225
  - Buoys . . . 225
  - Directions . . . 226
  - Light . . . 225
  - North channel . . . 225
    - anchorage . . . 225
  - Pilots . . . 225
  - South channel . . . 225
    - anchorage . . . 225
  - Tidal streams . . . 225
- Chimoti, Fiume . . . 469
- Chinde, Porto do . . . 237
  - Anchorage . . . 237
  - Beacons . . . 236
  - Buoys . . . 236
  - Depths . . . 236
  - Lights . . . 236
  - Pilotage . . . 237
  - Port facilities . . . 237
  - Tidal streams . . . 236
- Chinde, Rio . . . 235
  - Depths . . . 236
- Chindikasi islet . . . 464
- Chindio . . . 241
- Chinguno, Ponta . . . 225
  - Light . . . 225
- Chiromo . . . 240
- Chirundira, Ilha . . . 221
- Chisimaio :
  - Baía di . . . 475–481
    - anchorage . . . 479
    - aspect . . . 475
    - beacons . . . 478
    - lights . . . 476–478
    - passes, directions . . . 477–480
    - radio station . . . 481
    - town . . . 481
- Chiua Camlango, Isolotto . . . 470
- Chiuapisci, Isolotto . . . 470
- Chiueni, Punta . . . 471
- Chiveve, Ponta, light . . . 230
- Chiveve, Rio . . . 230
- Choca reef . . . 332
  - Beacon . . . 332
- Chogni hill . . . 443
- Chogwe village . . . 372
- Chokaa islets . . . 346
- Chokir, Ras . . . 354
- Chole bay . . . 338
- Chole island . . . 338
- Chole village . . . 338
- Chongoliani, Ras . . . 412
- Chongoni, Ras . . . 462
- Chosan, Fungu . . . 314
- Christina bay . . . 116
- Chuca village . . . 270
- Chué Ponta, light . . . 221
- Chukwani, Ras . . . 375
- Chumbe island . . . 376
  - Light . . . 376

Page

- Chumbe, Mwamba . . . 376
- Chunango mouth . . . 366
- Chwaka :
  - Bay . . . 391
    - anchorage . . . 392
    - tidal streams . . . 392
  - Head . . . 391
  - Village . . . 391
- Ciandrà, Isola . . . 470
- Ciovai :
  - Banco . . . 474
  - Isola . . . 473
  - Porto . . . 474
    - depths . . . 474
  - Village . . . 473
- Cintsa river . . . 155
- Cintza river . . . 155
- Ciula :
  - Banco . . . 473
  - Fiume . . . 473
  - Isola . . . 473
  - Porto . . . 473
    - anchorage, depths . . . 473
  - Village . . . 473
- Clark patch . . . 464
- Classen point . . . 129
- Cliff point, Black . . . 429
- Clifton bay . . . 90
- Climate and weather . . . 39
  - Climatic tables . . . 62–80
  - Coastal weather :
    - Union of South Africa . . . 39–49
    - Moçambique . . . 49–54
    - Tanganyika and Kenya . . . 54–60
    - Somalia . . . 60–62
  - General remarks . . . 39
- Club point . . . 130
- Cockburn, Port, *see* Port Cockburn
- Cockburn, Mount . . . 254
- Cockscomb, Mount . . . 124
- Cocola, beacon . . . 255
- Cocola, Rio . . . 254
- Coega river . . . 132
- Cogune, Ponta . . . 276
- Coiama :
  - Isola . . . 474
  - Porto . . . 474
    - anchorage, depths . . . 474, 475
  - Village . . . 474
- Colato, Monte . . . 195
- Collina, *see* proper name
- Colora river . . . 157
- Communications :
  - British East Africa . . . 35
  - Moçambique . . . 35
  - Somalia . . . 36
  - Union of South Africa . . . 34–35
- Cômo, Ilha . . . 226
  - Light . . . 227
- Conçeicao . . . 234
- Conducia :
  - Baía de, anchorages, directions . . . 269, 270
  - Cabo . . . 263
  - Village . . . 270
- Cone point . . . 189
- Congella . . . 183
- Congella channel . . . 182
- Congo, Ilha . . . 295

Page
Conhame hill 215
  Beacon 215
Conico, Monte 508
Constantia 81
Constantiaberg 81
Consular Officers, British . . 36
Cooper light 177
Cordata, Isolotti 476
Coróa, Ilha 253
Correntes, Cabo das . . . 214
  Currents 215
  Light 214
Cove rock 149
Cradock berg 116
Crawford reefs 293
Crocodile Vlei 161
Crusse :
  Ilha 271
  Village 271
Cuácua, Rio 241, 246
Cuama, Rio 234, 235
Cubata, Ilha 244
Culumulomo, Cabo . . . 272
  Light 272
Cumpadji, Ponta 271
  Beacon 272
Currents :
  Agulhas current . . . 20–22
    inshore countercurrent . 21–22
  East African coast current 24–27
  Equatorial current . . 23–24
  Equatorial countercurrent . 18
  General remarks . . 16–18
  Moçambique current . 18–19
  South Equatorial current . 18
  Southern Ocean current . 22–23
Cutfield, Monte 197
  Aspect 197
  Beacon 197
Cutfield shoal 198
Cuvumbi :
  Banco 474
  Isola 473

D'Ambre Cap 17
D'Urban cove 103
Dadi, Mwamba 309
Daedalus knoll 476
Dafne, Secca 498, 499
Dai, Ras 487
Dakali village 410
Dalgleish bank 117
Daloni islet 383
Dalrymple shoal 382
Danae shoal 197
Danâne village 491
Danger point (E. London) . . 154
Danger point (False bay approach) 103
  Light 104
Dante :
  Anchorage 508
  Beacon 508
Danzi reef 385
Daphne reefs 354
  Buoy 354
Daphne shoal 498, 499

Page
Dar es Salaam :
  Bay 353–355
    anchorages 358
    aspect 353
    beacon 355
    buoy 354
    lights 352, 355
  Harbour 355–360
    anchorages 358
    beacons 356
    buoyage 356
    climatic table 76
    directions 358
    lights 356
    pilots 357
    port facilities 358
    radio station 360
    signal station 357
    tidal streams 357
Daracas, Isola 473
Darakas island 473
Das Rolas, Ilha 289
  Anchorage 289
  Directions 289
Datcha, Fungu 368
Dau, Porto 493
Daua, Fiume 482
Daut, El 484
  Village 484
David Shoals 251
Decomba, Mto 306
Dedo, Monte 273
Deea, Ponta 242
Dehea, Ponta 242
Delagoa bay 196
Delfino, Secca 477
Delgado, Cabo 301
  Light 302
  Signal station 302
Dendini, Mto 347
Dentino, Punta 507
  Beacon 508
Deratisation 38
Devil's peak 81
Dhow channel 445
Dhow harbour 351
Diabo, Ponta de 284
Diamond spit 458
Dias Porto Bartolomeu . 223, 224
  Anchorage 224
  Buoyage 224
  Pilots 224
Diaz rock 94
Dick's :
  Bank 465
  Head 468
  Knoll 468
Didinta, Uadi 500
Die Bakke 113
Diep river 84
Diga, Punta 500
Dinaùda cairn 503
Dira reef 343
Direito, Canal 208
Dispatch rock 133
  Light-and-bell buoy . . . 133
Divadicioci, Isolotti . . . 470
Dixon bank 415
Djiedji, Ponta 272

Page
Djuma, Ponta 260
Doddington rock 135
Dodo village 421
Dodongi village 314
  Beacon 314
Dolo town 482
Dom Pedro jetty 138
Dome bluff 169
Domette shoal 198
Domoni, North Ras 397
Domoni, South Ras 395
Dondo, Rio 227
Donge hills 381
Dongo Kundu (Chake Chake bay) 399
Dongo Kundu (Lamu bay) . . 456
Doonside village 177
Double Mouth river 156
Doubt rock 474
Driefontein range 110
Drooge river 122
Duarte Pedroso, Porto de . . 278
Dubbio, Scoglio 474
Duiker island 91
Duiker point 91
Duin Fontein berg 104
Duine Rug 111
Duivenhoks river 111
Dumile hill 193
Dump, The 178
Duncan basin 88
  Berths, depths 88
  Lights 88
Dundas hill 195
Dunga village 365
Durban:
  Approaches 178
    anchorage 179
    beacon 178
    directions 179
    life-saving 184
    lights 178, 179
    pilots 181
    signal station 180
  Climatic tables . . . 69, 70
  Depths 181
  Dry docks 184
  Light-buoys 182
  Radio station 184
  Wharfage 182
Durdura, Ras 505
Durnford point 188
Durnford, Port, *see* Port Durnford
Duruma, Mto 435
Dutton cove 116
Dwessa head 160
Dyer island 105
  Anchorage, directions . . . 105

East Ferry point 355
East Gate 166
East London:
  Approaches 149
    anchorage 150
    current 151
    directions 151
    life-saving 154
    lights, fog signal 150

Page
East London: Approaches—*contd.*
    signal station 152
    tidal streams 151
  Climatic table 68
  Harbour 152
    depths 153
    port facilities 153
    wharfage 152, 153
East pier (Table bay) 87
East reef (Bird islands) . . . 135
East shoal (False bay) . . . 99
Ecingweni hill 164
Eil 504
Eil Marina 504–505
  Anchorage 504
  Village 504
Ekapapa, Ras 316
El, *see* proper name
Elands river 125
Elands Rivier range 124
Elba, Secca 485
Elefantes, Ponta dos 199
Elephant marshes 240
Elizabeth, Port, *see* Port Elizabeth
Elsie's bay 97
Elsie's peak 97
Emboyti river 169
Emoyeni hill 187
Emu rock 118
Enes, Porto de Antonio . 257–259
English pass 385–387
  Beacons 385–386
  Buoyage 385–386
  Directions 387
  Lights 386, 387
Enseada, *see* proper name
Entafufu river 169
Epidendron, Ilha 253
  Anchorage 253
  Light 253
Erme bay 113
Esparcelado de Oeste 208
Espiritu Santo, Rio . 203, 207, 208
Euia, Ponta 270
Evunga:
  Cliff 174
  River 174
  Village 174
Evungo cliff 174

Faddhi Araule rock-terrace . . 500
Fair point 468
False bay 95
  Beacons 95
  Light-and-bell buoy . . . 98
  Eastern side 96
    lights 97
  Northern side 97
  North-western side 97
    lights 93
  Western side 95
    beacons 96
False bluff 177
False cape 96
False islet 142
Famauali, Isolotto . . . 467, 468
  Current 467

Page

- **Fanjove island** 328
  - Light 328
- **Fanjove island, North** 347
- **Faure river** 125
- **Favatu, Isolotto** 476
  - Beacon 479
- **Fawatu reef** 384
- **Fawn, Baixo** 201
  - Light-buoy 201
- **Fawn bank** 343
- **Faza village** 463
- **Fazi harbour** 466
- **Fazi island** 466
- **Fernão Veloso, Baía de** . . 272–273
  - Anchorage 273
  - Depths, light 273
- **Ferry point, East** 355
- **Ferry point, West** 355
- **Field patch** 344
- **Filfil, Ras** 487
- **Filfilli, Punta** 487
- **Fili reef** 343
- **Fion, Ilha** 287
- **First Bluff point** 235
- **Fish bay, anchorage** 112
- **Fish point, Great, light** . . . 145
- **Fish point, Little** 145
- **Fish river, Great** 145
- **Fishoek bay** 97
- **Fiume,** *see* proper name
- **Flat point** 155
- **Flesh bay** 112
- **Flesh point** 112
- **Florenço, Pico** 195
- **Fly rock** 343
- **Fogo, Ilha do** 252
  - Anchorage 250
  - Light 252
- **Fontesvilla** 232
- **Formosa bay** 453–456
  - Aspect 453
- **Formosa peak** 123
- **Fosc, El** 503
- **Fountain point** 119
  - Beacon 119
- **Fountain rocks** 144
- **Foz,** *see* proper name
- **Fragosos, Montes** 278
- **Fred rock** 477
- **Fremantle, Ponta** 238
- **French pass** 385
- **Fuel** 36
- **Fughio, Ras** 320
- **Fugo, Ponta** 262
- **Fugu, Ras** 262
- **Fumba, Ras** 375
- **Fumo, Rio** 284
- **Fundu gap** 406
- **Fundu island** 404
- **Fungu,** *see* proper name
- **Funguni knoll** 408
- **Funzi bay** 427
  - Anchorage directions . . . 428
- **Funzi channel** 403
  - Beacons 403
  - Buoys 403
- **Funzi island** 403
- **Funzi village** 427

Page

- **Gabah, Ras** 503
- **Gabah, Wadi** 504–505
- **Gaivotas, Pedra das** 274
  - Light 274
- **Gaji hill** 449
- **Gal Uein rock-terrace** . . . 500
- **Gallagois rock-terrace** . . . 499
- **Gamtoos river** 128
- **Gansbaai** 103
- **Garàd beacon** 503
- **Garapão, Ponta** 200
- **Garmal, Ras** 505
  - Beacon 505
- **Garuin, Isolotto au** 490
- **Gaschera, Mwamba** 487
- **Gaschera village, El** 484
- **Gasciera, Mwamba** 487
- **Gauloni, Punta** 469
- **Gaze bay** 428
- **Gazelas, Praia das** 244
- **Géa, Ponta** 228
- **Genda Genda, Mount** 368
- **George, Port,** *see* Port George
- **George rock** 431
- **George town** 116
- **Gericke point** 116
- **Gesira village** 491
- **Geyser island** 105
- **Giama mosque** 489
- **Giamuini, Scoglio** 490
- **Gilib village** 490
- **Gingwera Mto** 327
- **Gipsy hill** 192
- **Giuba Fiume** 482
  - Depths 482
- **Giuba, Isole, general remarks** . . 467
- **Giumbo village** 482
  - Light 482
- **Glasson point** 129
- **Glenday patches** 384
- **Glendower peak** 143
  - Beacon 143
- **Glenton reef** 187
- **Gnabie river** 160
- **Goa, Ilha de** 264
  - Light 264
- **Gobuin** 483
- **Gogoni, Ras** 405
- **Goludo, Praia do** 288
- **Gomani bay** 421, 422
- **Gomani, Fungu** 314
- **Gome Laccua, Punta** 468
- **Gomen, Ilha** 272
- **Gonderschia village** 490
- **Gonewaan river** 156
- **Gonubie point** 154
- **Gonubie river** 155
- **Good Hope, Cape of** . . . 93–95
  - Directions 95
  - Life-saving 94
  - Lights 94
  - Radiobeacon 94
  - Signal station 94
- **Good Hope Province, Cape of** . . 3–5
- **Goosha river** 147
- **Goqo river** 160
- **Gordon reef (Mafia channel)** . . 343
- **Gordon reefs (Manda bay)** . . 464

Page
Gordons bay 96
  Anchorage 96
  Harbour 97
  Lights 97
Gorjão quay 203
  Depths 203
  Lights 204
Gouen tableland 498
Goukama river 116
Gouritz river 112
Governor's hill 129
Govura, Rio 223
Gqunge river 158
Grahamstown 141
Gran Rabai hill 488
Grande do Machangulo, Canal 208
Granger bay 84
Grassy hill 195
Gray patches 295
Gray rock 201
Great Brak river 116
Great Fish point 145
  Light 145
Great Fish river 145
Great Karroo 4
Great Kei river 156
  Anchorage 157
  Current, tidal streams 157
Great pass 385
Great Winterhoek 4
Greco, Banco di 496
Green Peaks 165
Green point (Aliwal shoal) 175
  Beacons 176
  Lights 176
Green point (Knysna) 120
Green point (Table bay) 84
  Light, fog signal 85
  Prohibited anchorage 84
Grenadier's Cap 123
Griffon patches 450
Groenfontein hill 144
Groot river 124
Groot river (Witte Els) 124
Grovenor hill 172
Grovenor Port, *see* Port Grovenor
Grue bank 107
Gualana river 147
Gubba, Ras 507
Gululle, Wadi 504
Gulnare reef 299
Gumula hill, beacon 214
Gumula, Ponta 214
Gungoyu patch 408
Gunia point 312
Gunja peak 360
Gunner's Quoin 104
Gurahane, Ras 505
Gurgurud, Lama, beacon 495
Gwaygang river 116
Gxara river 157

Hadjiri reef, Al 342
Hafun:
  Peninsula 507
  Ras, light 507
Haga Haga river 155

Page
Haga Haga village 155
Hamburg, North 147
Hamburg village 148
Hameye 454
Hammond rock, buoy 353
Hanawi, Mwamba 463, 464
Hangberg 32
Hang Klip, Cape 96
Hang Klip berg 96
  Compass adjustment 102
Haramu passage 405
Hardy bank 107
Harim Omaschia, Isolotto 491
Harion, Bur el, beacon 497
Harpshell sands 265
Harpshell spits 265
Hartenbosch river 114
Hatajwa hill 373
Hatambura islet 346
Havai, Punta 494
Havergal hill 192
Hawanja island, Mana 307
Hawaween rocks 475
Haycock islet 410
Hazine coast 505
Head reef, South 370
Hen Daier beacon 501
Henderson Cape 155
Herald, Port, *see* Port Herald
Hermanus 103
Hermes, Cape 167
  Light 167
  Signal station 167
Heuntnges river 103
Hinsuani islet 396
Hoäther bank 474
Hocti Daruti district 499
Hoek van Bobbenjaan 93
Hole-in-the-wall 163
Holland reef 129
Honing Nest river 108
Hood point 149
  Light, fog signal 149
  Rifle range 149
Hood reefs 470
Hoop lake, De 110
Hoop point 109
Hordio, Cor 508
Hordio salt pans, Cor 508
Hori Vanga 423
  Anchorage 424
Hospital spit 416
  Beacons 416
  Light 416
Hottentot Holland range 96
Hottentot Huisje 91
Hout bay 91–92
  Anchorage 92
  Aspect, beacons 91
  Light 92
  Port facilities 92
  Winds 92
Hout bay river 92
Howard rocks 425
Huendje, Lago 209
Hull rocks 309
Hully point 193
Humansdorp village 127
Humaul rocks 475

Page
Humewood:
  Light 134
Hur, El 500
  Anchorage 500
  Aspect 500
Hurdie, Khor 508
Huthera, El 394
Hyde Parker point 235
Hydra bay 103
  Anchorage 104
  Directions 104

Iamcumbi Cabo. 290
Ibo:
  Ilha do 286
    light 286
    signal station 286
  Porto do 286
    anchorage 288
    aspect 286
    beacon 287
    buoyage 288
    depths 287
    directions 289
    inner harbour 289
    tidal streams 288
Ice 27, 28
Icumbi, Scoglio 469
Iddam well 502
Igoda point 149
Igoda river 148, 149
Igulu river 148
Igwili river 156
Ikogha river 162
Ikulu Tumuli 173
Ilha, *see* proper name
Ilheu, *see* proper name
Illigh:
  Anchorage 504
  Ras 503
  Village 504
Illovo river 176
Illovo spit 177
Ilovo river 176
Imbi reef 331
Imbo bank 282
Imbo, Enseada do 281
  Anchorage 282
Imbumbe hill 192
Impequin river 147
Imtwendwe river 155
Incarha river 156
Incomati, Rio 209
  Buoys 209
Indoni house 175
Indujo, Baixo 280
Infanta, Cape 110
Infusse Baixo 261
Ingoane 290
Ingomaimo, Ponta 224
  Old lighthouse 224
Ingomaimo, Rio 225
Ingomana river 160
Inhabucula beacon 213
Inhaca:
  Baixos da 198

Page
Inhaca—*contd.*
  Cabo da 196
    lights. 196
    signal station 196
  Canal da 208
  Ilha da 196
  Monte, beacon 196
  Portinho da 208
    anchorage 208
Inhacamba, Ilha 235
Inhacombe, Ilha 235
Inhagotou beacon 213
Inhamacatuia, Rio 233
Inhambane, Baía de 216
  Anchorages 217
  Beacons 217
  Buoys 217
  Pilots 217
  Tidal streams. 217
  Town 218
Inhambane, Cabo 214
Inhambane, Rio 216
  Anchorage 217
Inhamiara, Ponta 236
  Light 236
Inhamiara, Rio 236
Inhamissengo, Rio 234
  Anchorage 235
  Directions 235
  Tidal streams. 235
Inhamitule hill 218
  Beacon 218
Inhampura:
  Baixos de 211
  Rio 210
Inhandunje, Ilha 224
Inhangurue channel 234
Inhangurue, Ilha 235
Inhaombe, Rio 238
Inhapanvale, Laguna 212
Inhapavala, Lagoa 212
Inhassoro, Ponta 223
Inhatumunge hill 214
Injaca, Ilha 264
Injaca Pequena, Ilha 264
Inkongweni river 173
Inkonyana hill 192
Inkyanza river 100
Inner channel:
  Kilwa Kivinje to Ras Kanzi 329–333, 341–344
    currents and tidal streams . 344
    directions 344
  Mto Kipumbwe to Pangani bay 369
  Pangani bay to Mwambani bay 412
  Ras Kungunganda to Ras Wasin 423
    current and tidal streams . 426
    directions 427
  Ras Wasin to Chale point . 428
    directions 429
Inner Makatumbe island . . . 353
Inner Obelisk point 118
Inner pass (Zanzibar) 375
Inner Sinda island 352
Interno Passo 478
  Lights 478
Intsoban plateau 162
Inyaka, Ilha 264
Inyangoma, Ilha 242

Page
Inyarha river 155
Inyoni river 186
Ionte village 482
Isecomba, Isolotto 471
Isezela 175
Isikombi river 173
Isikota river 173
Isipingo Beach village . . . 177
Isipingo river 177
Island View :
  Channel, depths 181
  Wharfage 183
Isola, *see* proper name
Isolotto, *see* proper name
Itala :
  Punta 496
  Roads 496
    anchorage 497
    beacons 496
    light 496
  Village 496
Iunda Punta 470
Iundu Iundu 473
Iwatine, Ras, light 431
Iwe-la-Manda 464
Izotsha river 174

J'anjani, Baixo de 223
Jabire island 257
Jacober village 491
Jahleel island 133
Jamali, Ilha 270
Jandoni, Ras 310
  Beacon 310
  Buoys 310
Janga, Enseada de, light . . . 271
Jansen's rock 144
Jeffery's rock 296
Jeffrey's bay 128
Jesser point 192
Jewe reef 328
  Beacon 328
Jibana hill, beacon 443
Jimpia, Enseada de 282
Jina island 338
João Belo, Vila de 211
Jombo mountain . . . 412, 423
Jomvu, Mto 443
Juani island 338
Juba islands 467
  Current 467
  General remarks 467
Juba river 475
Jujura river 159
Juma, Mto 424

Kaaimans river 116
Kabeljaauw river 128
Kabole river 160
Kaf, Ras 490
Kafani river 155
Kaffirkuils river 111
Kaixaventuane beacon . . . 211
Kalifi, Mto 453

Page
Kalk bay 97
  Light 98
Kalombo creek 265
Kambati river 172
Kambe peak 443
Kanda, Ras 427
Kankadya :
  Patch 354
  Peninsula 354
  Ras 353
Kanoge hill 345
Kanyika islet 456
Kanzi, Ras 348
  Light 348
Kaole village 363
Karange islands . . . 411, 413
Karawa, Lake 453
Karbonkelberg 82
Karedouw peak 123
Kariega river 142
Karredouwsberg 123
Karroo, Great 4
Kashani island 402
Kasone, Ras 412–418
  Lights 415
  Signal station 415
Kasouga river 142
Katunga 240
Kau village 455
Kauma peak 443
Kauri reef 341
Kavinga village 346
Kebandahodi shoals 363
Kebrabasa rapids 238
Kefani river 155
Kegomacha, Ras 393
  Light 407
Kei river, Great 156
  Anchorage 157
  Current, tidal streams . . . 157
Kei kop 156
Keimouth village 157
Keiskama point 147
Keiskama river 147
Kendwa island 351
Kenton-on-Sea 142
Kenya Colony and Protectorate 12–14
  General remarks . . . 12–13
  Physical features . . . 13–14
  Ports 14
  Products 14
  Railways 14
Kenya, Mount 14, 454
Keonga Bay, *see* Quionga bay
Kepandiko islet 386
Kera, Mto 319
Kera, Ras 319
Keramimbi islet 300
Kerimba range 422
Kero Niuni islet 291
Kero Niuni, Passagem de . . . 292
  Anchorages 292
Kerries bay 103
Keurbooms river 122
Khor, *see* proper name
Kiassi mouth 334
Kiberamini, Ras 441
  Beacon 441
Kibokoni village 448

Page
Kibondo anchorage 338
Kibondo island 338
Kibungwe, Ras 319
Kidandoni, lights 355
Kidomoni, Ras 441
Kiengieni, Mto 333
Kifinga, Ponta 269
Kifuki island 294
Kifuki pass 298
  Anchorage 298
  Tidal streams 298
Kigangone, Ras 435
Kigoma 360
Kigomasha, Ras . . . 393, 407
  Light 407
Kigombe village 410
Kigunguli hill 380
Kikogwe, Ras 368
Kikokwe, Ras 368
Kikone 326
Kikunguni village 335
  Buoy 336
Kikunya :
  Arm 335
  Mouth, buoy . . . 335, 336
  Village 336
Kikwaju creek 330
Kikwero, Mwamba 351
Kilifi :
  Gap 443
  Mto 446
    anchorage 447
    approaches 444
      anchorage 445
      beacons 445
      passes 445
      tidal streams 447
    depths 446
    directions 447
  Ras 419
Kilima, *see* proper name
Kilimanjaro mountain . . . 371
Kilimanzi mountain . . . 165
Kilindini creek 462
Kilindini, Port, *see* Port Kilindini
Kilindini, Ras (Manda bay) . 462
Kilindini, Ras (Port of Mombasa) 436
Kilindini reefs 436
  Lights 437
Kilindoni village . . . 339, 340
  Buoy 340
Kilulu, beacons 400
Kilulu hill . . . 412, 422
Kilwa island 321
Kilwa point 326
Kilwa Kisiwani harbour . 323–327
  Anchorage 325
  Beacons 324
  Buoy 325
  Directions 325
  Tidal streams 325
Kilwa Kisiwani village . . . 326
Kilwa Kivinje . . . 327–329
  Anchorage 328
  Approaches . . . 327, 328
    beacons 327
    light 328
  Buoy 328
  Climatic table . . . 75

Page
Kilwa Kivinje—*contd.*
  Directions 328
  Tidal streams 328
  Town 327, 329
Kilwa Main pass . . . 327
  Directions 328
Kimbiji, Ras 348
Kimbore reef 332
Kinasi pass 338
King Oscar hill 192
Kingani, Mto, *see* Kingoni Mto
Kingani village 410
Kingoje bay 397
Kingoji, bay 397
  Anchorage 398
Kingoji, Ras 397
Kingone, Mto 364
Kingwere village . . . 365
Kingwilliamstown . . . 141
Kiomboni mouth . . . 334
Kiongoroni branch . . . 334
Kioni village 445
  Beacons 445
Kipakoni, Mwamba . . . 324
Kipakoni, Ras 323
Kipange, Mto 381
Kipini :
  Light 455
  Village 455
Kipumbwe, Mto . . . 367
Kipumbwe reefs . . . 368
Kipumbwe village . . . 367
Kipungani, Mlango . . 457–459
Kipwa Gini 375
Kipwa Mtu 424
Kirk point 232
Kiromo, Ras 424
Kiromoni, Ras 360
Kirongwe bay 340
Kirongwe, Mto 340
Kirui island 423
Kirui, Mto 423
Kiruki peak 423
Kisanga islet 291
Kisanga village 270
Kisanga Mungu, Mwamba . . 295
Kisangani, Ras 410
Kisangula, Ilha 270
Kisaoni, Ras 441
  Beacon 441
Kishi Kashi, Port, *see* Port Kishi Kashi
Kisiju village 346
Kisiki reef 377
  Light-buoy 377
Kisikimta reef 367
  Boat harbour 367
Kisima, Mwamba . . . 397
Kisimani channel . . . 341
  Beacons . . . 341, 342
  Buoys 342
Kisimani, Ras 337
Kisimga Mkono Ras . . . 425
Kisingati island 462
Kisiti islet 426
Kisiwa, *see* proper name
Kisocha, Mwamba . . . 295
Kisocha, Restinga Mwamba . 295
Kisumbo, Ponta . . . 264

- Kisungura islet 299
- Kiswasi, Fungu 330
- Kiswere:
  - Harbour . . . 320–321
    - anchorage 320
    - aspect 320
    - directions 320
  - Mto 321
  - Village 320, 321
- Kitamba, Ras 420
- Kitambuu islet 400
- Kitandulo, Ponta 261
- Kitanga reef 411
- Kitanga tangani, Mlima . . 455
- Kitao knolls 458
- Kitao, Ras 457
- Kitapumbe reefs 363
- Kitapumbe village 363
- Kitoka, Ras 444, 446
  - Beacons 445
  - Light 444
- Kitoni cliffs 338
- Kitope hill 329
- Kitshalikani village 421
- Kitua, Ras 453
- Kitugamue, Mwamba 419
- Kiunga village 468
- Kiungamini island 468
  - Anchorage 468
- Kiungani 377
  - Lights 378
- Kiuya village 301
- Kiuyu, Port, *see* Port Kiuyu
- Kiuyu, Ras 407
- Kivani, Fungu 422
- Kivolani village 262
- Kivumangao village 346
- Kivurugu, Ras 322
- Kiwaihu:
  - Bay 466
    - anchorage 467
  - Island 466
  - Knoll 468
  - Peak 466
- Kiwanda, Restinga 295
- Kiwani bay 374
- Kiwani village 409
- Kiyomoni, Ras 381
- Kizimkazi:
  - Fungu 349
    - anchorage 349
    - current 349
  - Patch 391
  - Ras 373
    - current 373
  - Village 373
- Kizingati island 462
- Kizingiti, Mwamba 292
- Kizungu, Ilha 249
- Klaasjagers river 93
- Kleena river 159
- Klein river 103
- Kleinmond rivers 145
- Klip river 124
- Klipdrift river 126
- Klipfonteinberg 127
- Klippen point 125
- Knob hill 185
- Knysna:
  - Harbour 117
    - anchorage 120
    - aspect 117
    - beacons 119
    - buoys 119
    - depths 118
    - directions 120
    - life-saving 121
    - tidal streams 120
  - River 117
  - Town 121
- Kobonqaba point 157
- Kobonqaba river 157
- Kodian village 409
- Kogel bay 96
- Kojani village 409
- Kokota:
  - Gap 403
    - beacons 403
  - Island 403
- Kokwe reef, Mako 426
- Koma island 346
  - Anchorage 346
- Kombeni bay 374
- Kombeni peninsula 373
- Komkromma point 122
- Komkromma river 124
- Kommetje bay 91
- Kommetje village 93
- Komona old town 455
- Komuhine beacon 221
- Konduchi harbour, *see* Kunduchi harbour
- Konjoro, Mto 446
- Konjoro village 446
- Kor, *see* proper name
- Koronjo, Ras 351
- Kosi lake 194
- Kosi river 1, 194
  - Anchorage 195
- Kowie point 143
- Kowie river 143
- Krantzhoek 118
- Krom bay 127
- Kromme bay, anchorage . 127, 128
- Kromme river 127
- Kruisfontein 127
- Kubwa Mwamba Majiwe . . 292
- Kumbeni peninsula 373
- Kundeni knoll 407
- Kunduchi:
  - Harbour 361
    - anchorage 362
    - directions 362
  - Village 360
- Kunglio 336
- Kungunganda, Ras 422
- Kungani village 400
  - Beacons 400
- Kungwe, Mount 365
- Kunkulu mountain 165
- Kunwongbe, Ras, beacon . . 431
- Kurasini 356
- Kurasini, Mto 356
- Kutani village 348
- Kwaai hoek 142
- Kwale:
  - Bank 421

Page
Kwale—*contd.*
  Bay 420
  Island (Mafia channel) 346
    buoy 346
  Island (Manza bay) 420
  Island (Zanzibar) 374
  Reefs 343, 346
  Village 420
Kwani river 148
Kwanyane river 172
Kwata island 396
Kwawa, Ras 414
Kwawa reef, buoy 415
Kwayama island 474
Kwayama, Port 474
Kwelegha point 155
Kwelegha river 155
Kwenurha river 155
Kwenxura river 155
Kwiyeye, Mwamba 464
Kwyhu bay, *see* Kiwaihu bay

Lac, *see* proper name
Lago, *see* proper name
Lagoa river 209
Lagoa shoal 210
Laguna, *see* proper name
Lama Gurgurud 495
Lamkunama, Fungu 292
Lamu:
  Bay 457–458
    anchorage, aspect 458, 460
    directions 460
    light 458
    signal station 458
  Harbour 458–461
    anchorage 460
    beacons 459
    buoys 459
    depths 459
    directions 460
    tidal streams 460
  Island 457
  Town 461
Landmankop 132
Langdon rocks 382
Langua Pembe, Isolotti 472
Larde, Rio 256
Latham bank, current 349
Latham island 349
Lauries bay 129
Leadsman shoal 192
Lebombo Berge range 193
Lechmere hill 339
Leisure island, beacon 118, 119
Leopard point 448
Leopard reef 450
Lepulula island 297
Leste, Baixo de 211
Leste, Canal do 245
Letokoto, Mto 305
Letonda, Mto 305
  Buoys 305
Levante, Passo di 478, 480
Leven:
  Banco (P. de Moçambique) 266
  Bank (Ras Nungwi) 380

Page
Leven—*contd.*
  Point (C. Barracouta) 111
  Point (C. Vidal) 192
  Reefs (Mombasa) 431
  Shoal 192
Levura, Ponta 293
Liberal, Ponta 236
Lichamelelo, Ras 310
  Beacon 310
  Buoy 310
Licuare, Rio 246
Licungo, Rio 248
Life-saving stations 30
Ligonha, Rio 254
Limbuiza, Ponta 281
Limpopo:
  Banco 211
  Rio 210
    beacon 211
    buoys 211
    light 210
    tidal streams 211
Linde, Rio 242
  Anchorage 243
  Depths 243
  Pilots 243
Lindi:
  Bay 315–318
    anchorage 315
    aspect 315
    pilots 316
    tidal streams 317
  Town 318
    climatic table 74
Linga-Linga, Baía de 217
Linga-Linga, Ponta da 216
Lione, Collina del 470
Lion's head 301
Lion's head, Little 82
Lion's Paw, North 90
Lion's Paw, South 90
Lion's Rump, signal station 82
Lipulula island 297
Little Brak river 116
Little Fish point 145
Little Lion's head 82
Liwotoni, Ras 436
Llandudno bay 91
Local magnetic anomalies 30
Lockyer patch (Wasin channel) 426
Lockyer shoal (Formosa bay) 455
  Buoy 455
Logan stone 112
Logies rock 91
Logunus, Montes 273
Lokotonazi mouth 330
Lombazi river 172
Londo, Monte 281
London, East, *see* East London
Lopo, Ponta 262
Lourenço Marques, Baía de 196
  Anchorage 199
  Directions 202
  Light-buoys 198
  Eastern and southern shore 199
    beacons 199
    light 199
  Light 199

Page
Lourenço Marques, Baía de—*contd.*
  Northern approach 197
    aspect 197
    beacon 197
    channel 199
    directions 203
  North-western shore . . 200
    beacons 200
    lights 200
  Southern approach 198
    anchorage 199
    channels 198
  Tidal streams 202
Lourenço Marques harbour 203–208
  Anchorage 205
  Climatic table 71
  Depths 203, 204
  Directions 206
  Dry dock 206
  Entrance channel 204
    beacons 204
    lights 204
    light-buoys . . . 204, 205
  Lights 204
  Radio station 207
  Signal station 205
Lovemore hill 129
Luabo, Ponta 237
Luabo de Este, Rio 235
Luabo de Oeste, Rio 232
Luala reef 328
Luale Ras 363
Lua-Lua, Rio 246
Luanginga river 238
Luangwa river 238
Luaua, Rio 232
Luena river 238
Lugh Ferrandi 483
Lukuledi, Mto 315
  Anchorage 317
  Beacons 317
  Buoys 317
  Depths 316
  Directions 318
  Lights 316
  Tidal streams 317
Lulo, Ponta 277
Lulu shoal 309
Lumbo, Banco do 265
Lumbo creek 265
Lumbo village 265
  Light 265
Lunga village 262
Lupata gorge 241
Lupatana river 172
Lúrio, Baía do 280
  Anchorage 281
Lúrio, Rio 280
Luseti, Mto 292
Luvinza, Pedra 295
Lwale, Ras 363
Lwandilana river 164
Lwandili river 164
Lwinza, Pedra 295

M'dua reef 428
M'jagatya hills 190

Page
M'kame reef 427
M'luli, Rio 256
M'sulo, Ponta 250
M'tali, Mto 318
Maalgaten river 116
Mabamba beacon 210
Mabber, Ras 505
  Beacon 506
Mabjechine beacon 210
Mabruch hill 469, 470
Macaloé, Ilha 290
Macalonga, Ponta 252
Macaneta, Ponta de 196
Macasi village 484
Macau, Ilha de 224
Machanga, Ponta 224
Machangi reefs 332
Machangulo, Baía de 208
  Anchorages 208
  Depths 208
Machanagulo, Canal Grande de . 208
Machekâne 219
  Beacon 219
Macheriuka, Kilima 305
Machuisi, Ras 366
Machuisi reef 367
Macique, Ponta 227
  Beacon 227
Mackenzie point 431
Maclear, Cape 93
Maconde, Ilha de 223
Macovane, Ponta 223
Macula 286
Macuse, Rio 247, 248
  Beacons 247
  Buoys 247
  Depths 247
  Directions 248
  Tidal streams 248
Macuti, Ponta 220
  Light 228
  Signal station 228
Macuti, Rio, beacon 232
Madagascar reef 147
Madjovi rocks 314
Maduvi bank 342
Mafacà, Scoglio 485
  Beacon 485
Mafamede, Ilha 257
  Anchorage 257
  Light 257
Mafia channel 341–345
  Currents 344
  Depths 341
  Directions 344
  Tidal streams 344
Mafia island 337
  Aspect 337
Mafomene, Ponta 223
Maftaha bay 428
Magadi jetty 438
Magnetic anomalies, Local . . 30
Magogoni village 351
Magwa forest 169
Magwa range 162
Mahazamu, Mwamba 319
Maiaia, Ponta 273
  Light 274
Maidstone rock 99

Page

- Mainhlyami hill, 188
- Maitland hill, 146
- Maitland river, 129
- Maiyapa bay, 299
  - Anchorages, 300
  - Directions, 301
  - Tidal streams, 300
- Maiyapa, Mto, 300
- Majiwe Kubwa, Mwamba, 292
  - Anchorage, 293
- Makabe, Ras, 356
  - Lights, 357
- Makatumbe island, Inner, 353
- Makatumbe island, Outer, 353
  - Light, 353
- Makatumbe patch, buoy, 357
- Makatumbe reef, 353
- Mako Kokwe reef, 426
- Makome, Mwamba, 368
- Makongwe island, 395, 396
- Makunduchi, Ras, 391
  - Light, 391
- Makunga, Fungu, 298
- Makunga islet, 294
- Makungwi island, 395
- Makupa causeway, 429
- Makupa creek, 435
- Mal Gat river, 116
- Malagas, 111
- Malindi:
  - Bank, 450
  - Breakwater (Zanzibar), 389
  - Point, 448
  - Port of, 448–451
    - anchorage, 450
    - beacons, 448
    - current, 450
    - directions, 451
    - lights, 448
    - reef, 448
    - road, 450
  - Spit (Zanzibar), 386
  - Town, 449, 451
- Mallable, Ras, 495, 496
- Mamba Gasciera, 487
- Mamba, Mlima, 320
- Mambrui point, 449
- Mambrui village, 449
- Mamoja, Mto, 427
- Mana Hawanja island, 307
- Managumba, Ras, 313
- Manamku, Ras, 348
- Manara island, Songa, 321
- Mancabale, Restinga, 280
- Manda:
  - Bay, 463
    - anchorage, 464
    - directions, 464
    - tidal streams, 464
  - Island, 462
  - Peak, 458
  - Roads, 463
    - depths, 463
    - directions, 464
- Manda Toto, 462
- Mangawapani light, 384
- Mangawapani village, 384
- Mange reef, 341
  - Beacon, 341

Page

- Mangea, Mount, 448
- Mangrove island, 459
- Manhaha, Ponta, 281
- Manicho, 209
- Manthlonetchwa hill, 169
- Manubie forest, 159
- Manubie river, 158
- Manuel da Silva, Ilha, 287
- Manza:
  - Bay, 420, 421
    - directions, 421
  - Mto, 421
  - Village, 421
- Manziamyama river, 162
- Maone, Ponta, 199
  - Beacon, 200
- Maotas beacon, 201
- Mapanda, 232
- Mapanya islet, 402
- Mapape, Fungu, 379
- Mapape, Mwamba, 379
- Mapêta, Banco de, 265
- Mapêta, Ponta, 265
- Mapêta sands, 265
- Maputo, Canal do, 203
  - Buoys, 208
  - Tidal stream, 208
- Maputo, Grande esparcelado do, 208
- Maputo, Rio, 208
- Mapuzi hill, 163
- Mapuzi river, 163
- Maquinze, Baixo, 288
- Maquitane, Ponta, 210
- Maquival, 248
- Marari, Mto, 290
- Marca Collina, 478
  - Beacons, 478
  - Lights, 478
- Marcus bay, 109
- Marembo reef, 424
- Marendego village, 330
- Marengi village, 228
- Marereni village, 453
- Margate village, 174
- Marghinisi, Scoglio, 485
- Marhubi palace, lights, 386, 387
- Maria, Ponta, 238
- Maria, Rio, 238
- Maria Luiza, Ponta, 279
- Marigariga cliff, 273
- Marima, Fungu, 341
- Mariner shoal, 367
- Maringo branch, 334
- Marinhos, Banco dos Cavallos, 244
- Marinhos, Ilha dos Cavallos, 244
- Marion island, 2
- Mark island, 464
- Marongo village, 300
- Marrebo, Baixo, 254
- Marromeu village, 241
- Martha point, 109
- Masiuane, Ponta, 256
- Massangage, Rio, 279
- Massangano, 239
- Massassari, Pedra, 295
- Massaua beacon, 498
- Matadane, Serra de, 254
- Matadoni village, 461
- Matawapa river, 444

Page
Matemo, Ilha 287
Matirre, Ponta 249
  Light 249
  Signal station 249
Matjes river 123
Matola, Rio 208
Matola wharf 207
Matonde beacon 195
Matumbe Makupa island 396
Matumbene island 396
Matumbi range 329
Matumbini island 396
Matunda, Ras 305
Matuso, Ras 324
Maunhane, Ponta 281
  Light 281
Mavemavili, Ras 420
Mavendeni, Rio 232
Maverani, Ponta 249
Mavudyi, Mto 323
Mawe, Mwamba 370
Mawe, Mdogo 370
Maweli, Ras 319
Maydon channel 181
  Buoyage 182
Maydon wharf 183
  Depths 183
Mazaro 241
Mazarui, Mwamba 456
Mazemba, Rio 248
Mazeppa bay 159
Mazeppa point 159
Maziwi island 369
  Anchorage 369
Mbachiwonaki, Fungu 316
  Beacons 317
Mbanja, Mto 318
Mbaraki creek 436
  Slipway 440
Mbatyi river 169
Mbegani, Ras 362
Mbegani village 363
Mbiongo, Ras 456
Mbisi, Ras 339
Mboamaji village 351
Mbogolo hill 444
Mbringa mountain 412
Mbudya:
  Island 361
  Patches 354
  Spit 361
Mbuyuni, light 437, 440
Mbwakuni reef 364
  Beacon 364
Mbwamaji harbour 352
  Anchorage 352
  Directions 352
Mbwamaji village 351
Mbweni:
  Ras 375
  Reefs 363
  Village 362
Mbwezi bay 304
Mbwezi village 304
Mcetyana river 158
Mchangamneni shoal 463
Mchangamra, Ras 322
Mchangamwe, Ras 436
  Lights 437

Page
Mchengangazi inlet 409
  Anchorage 409
Mchinga bay 319
  Anchorage 319
  Directions 319
Mchinga range 323
Mchinga town 319
Mchinga village 319
Mcholi, Mwamba 291
Mcwasa point 162
Mcwasa river 162
Mdemba, Mlima 315
Mdjumbi, Ilha 291
  Light 291
Mdjumbi pass 291
  Anchorage 291
Mdogo Buiuni reef 367
Mdudu village 392
Mecade, Baixo 260
Mecirro shoal 263
Mecontene, Ponta 277
Mecuburi, Rio 277
Mécufi, Rio 281
Mécufi Village 281
Mefunvo, Ilha 284
Meghet village, El 498
  Beacon 498
Mehire, Rio 283
Meige, Rio 260
Meio, Baixo do 198
Meio, Canal do 198
Mejungo, Rio 219
Melai, Rio 250
Melambe, Rio 234
Melela, Rio 251
Melville village 175
Memba, Baía de 277
  Anchorage 277
Memba village 277
Membeuso reef 332
  Beacon 332
Menai bay 373
Menskop point 93
Menuca village 256
Mepira, Ponta 282
  Light 283
Merca:
  Anchorage 489
  Aspect 488
  Beacons 488
  Current 489
  Depths 488
  Lights 488
  Port facilities 489
  Town 490
Mercer rocks 465
Meregh 498
  Anchorage, depths 498
Meridi, Rio 282
Meruli wells 496
Mesa Monte 264
Mesale island 394
Mesali gap 402
Mesali island 394, 399
Meshanga, Ilha 295
Messequera village 282
Metacáua, Ponta 280
Metuburi 238
Metupa, Ponta 278

Page
- Mévu, Baixo . . . 288
- Mewstone rock . . . 118
- Mezzo, Punta di . . . 503
- Mezzo, Secca di (Chisimaio) . 477
- Mezzo, Secca di (Itala) . . . 496
- Mgambo, Mto . . . 415
- Mgau, Mwania . . . 313
- Mhinduro mountain . . . 412
- Miasi, Ponta . . . 279
- Micalà, Bender . . . 472
  - Anchorage . . . 472
- Michamvi point . . . 391
- Mida creek . . . 448
- Middle :
  - Bank, North . . . 465
  - Bank, South . . . 465
  - Islet . . . 396
  - Reef . . . 444
- Midira, Mwamba . . . 424
- Miewi island . . . 338
- Mifuni hill . . . 401
- Miguel, Baixo . . . 257
- Mihezi, Rio . . . 283
- Mikindani :
  - Bay . . . 308–313
    - anchorage . . . 309
    - buoy . . . 309
    - light . . . 308
    - pilots . . . 310
  - Harbour . . . 312
    - anchorage . . . 313
    - beacon . . . 313
    - buoys . . . 313
    - directions . . . 313
    - tidal streams . . . 313
  - Village . . . 313
- Miko, Fungu . . . 365
- Miles Barton reef . . . 110
- Milibangalala, Ponta . . . 195
- Militão :
  - Banco do . . . 244
  - Canal do . . . 245
  - Ilha do . . . 244
- Mill river . . . 116
- Millard bank . . . 352
- Millers point . . . 95, 96
- Milnerton radio station . . . 84
  - Lights . . . 84, 85
- Mincahana, Baixo de . . . 223
- Minto hill . . . 83
- Minyani reefs . . . 423
- Mionge, Ilha . . . 293
- Mionge, Passagem de . . . 295
- Miramba, Ras . . . 326
  - Buoy . . . 328
- Misadjuana, Baixo . . . 224
- Misete creek . . . 312
- Mitani, Ras . . . 442
- Mitiquite, Rio . . . 262
- Mituasi, Ponta . . . 279
- Miugani islet . . . 396
- Miugani, Ras . . . 396
- Miuguri, Ponta . . . 274
- Miwi islet . . . 374
- Miza, Fungu . . . 348
- Miza reefs . . . 332
- Mjimpia village . . . 352
- Mjimwema, Ras . . . 352
- Mjimwema village . . . 352

Page
- Mjoho, Mlima . . . 309
- Mkadini, Ras . . . 439
- Mkadini Bay . . . 421
- Mkadya, Fungu . . . 362
- Mkambati river . . . 172
- Mkanda Mlango . . . 462
- Mkiwani creek . . . 409
- Mkiwani inlet . . . 409
- Mkoani :
  - Channel . . . 396, 397
  - Port of . . . 396
    - anchorage . . . 397
    - beacon . . . 397
    - buoys . . . 397
    - lights . . . 397
- Mkokotoni :
  - Harbour . . . 382–384
    - anchorage . . . 384
    - buoys . . . 382
    - depths . . . 382, 383
    - directions . . . 384
    - tidal streams . . . 383
  - Village . . . 382
- Mkono, Ras Kisimga . . . 425
- Mkonumbi, Mlango . . . 462
- Mkonumbi village . . . 462
- Mkufi, Rio . . . 281
- Mkufi village . . . 281
- Mkumbi, Ras . . . 339
  - Anchorage . . . 340
  - Light . . . 339
- Mkumbuu, Mwamba . . . 402
- Mkumbuu peninsula . . . 399
- Mkunga islet . . . 300
- Mkuu, Mwamba (Mafia island) . 340
- Mkuu, Mwamba (Ras Pombwe) . 330
- Mkwaja patches . . . 368
  - Buoy . . . 368
- Mkwaja village . . . 367
- Mkweni river . . . 172
- Mkya, Ras . . . 313
- Mkya village . . . 315
- Mlango, *see* proper name
- Mlima, *see* proper name
- Mlinga mountain . . . 412
- Mluri, Mto . . . 299
- Mluri, Porto . . . 299
- Mmawali sand . . . 383
- Mn'wena river . . . 164
- Mnangani, Mto . . . 303
- Mnara, *see* proper name
- Mnara island, Songa . . . 321
- Mnara, Isolotto . . . 485
- Mnara, Torre . . . 492
- Mnarini village . . . 446
- Mnasi :
  - Bay . . . 307–308
    - anchorage . . . 308
    - directions . . . 308
    - tidal streams . . . 308
- Mnasi village . . . 308
- Mnasini island . . . 420
- Mnasini, Ras . . . 420
- Mncwasa point . . . 162
- Mncwasa river . . . 162
- Mnenu river . . . 164
- Moa :
  - Bay . . . 421, 422
    - anchorage . . . 422

Page
Moa—Bay—*contd.*
    buoys 422
    directions 422
  Town 422
Moarenho, Rio 252
Moarongo village 411
Mocambique:
  Channel current . . . 18–20, 21
  Communications 8
  Current 18–20
  General remarks 6–7
  Physical features 7
  Ports 8
  Products 8
  Ilha de 266
    lights 266
    signal station 266
    storm signals 269
  Porto de 264–269
    anchorage 267
    beacons 265
    buoyage 267
    climatic table 73
    depths 266
    directions 268
    lights 265
    pilots 267
    port facilities 268
    radio station 269
    signals 266
    tidal streams 267
Mocambo:
  Baía de 261–263
  Porto de 262
    anchorage 263
    depths 263
    directions 263
Mocímboa, da Praia, Porto de 293–298
  Anchorage 296
  Buoys 296
  Directions 296
  Light 297
  Passes 293
    light 294
  Tidal streams 296
Mocímboa, Mto 293
Mocímboa, town 297
Mocucuni, Ponta de 216
Moebase, Rio 251
  Anchorage 252
  Beacons 251
  Buoys 251
  Depths 251
  Directions 251
  Tidal streams 252
Moebase village 251
Mogadiscio 492–494
  Anchorage 493
  Climatic table 80
  Current 493
  Lights 492
  Radio station 494
  Signal station 493
  Town 493
Mogincual, Rio 260
Mogundulo, Ilha 290
Mohoro:
  Bay 330
  Mto 330

Page
Mohoro—*contd.*
  Village 330
Mokambo bay 261
Molele rapids 239
Molungú, Ilha 222
Moloqué, Rio 252
Moma:
  Ilha de 256
  Porto de 254
    beacon 255
    buoys 255
    caution 254
    depths 254
    outer anchorage 255
    pilots 255
    tidal streams 255
  Rio 254
Mombasa:
  Gap 430
  Island 429
  Port of 429–443
    anchorage 432
    aspect 430
    clmatic table 79
    directions 442
    lights 431
    light-buoy 441
    radio station 443
    regulations 433–435
    signal station 432
    tidal streams 441
  Town 442
Mombawaka reef 332
Mombi, Ras 321
Monabo, Rio 262
Monaco, Ilha 252
Monaepa, Banco de 249
Monaepa, Ponta 249
Monamoera, Ponta 284
Monapo, Rio 262
Mondene, Rio 242
Monga village 421
Mongo island 307
Mongo, Ponta do 217
Mongoni creek 463
Monico, Baixo 258
  Beacon 258
Moniga, Rio 248
Monkey point 119
Monte, *see* proper name
Montepuês, Baía de 285
Montepuês, Rio 285
Montomonho, Rio 262
Moore bank 374
Morgan bay 156
Morgan bay village 156
Morgan, Cape 156
  Anchorage 156
Morris point 111
Morumbala marshes 240
Moscas, Canal das 245
Mossel bay:
  Anchorage 114
  Beacons 113
  Climatic table 6
  Directions 114
  Harbour 115
    depths 115
    jetties 115

Page

- Mossel bay:—*contd.*
  - Light . 113
  - Port facilities . 115
- Mossoril creek . 265
- Mossuril creek . 265
- Mostert's bay . 97
- Mouillé point . 84
- Mount Vale . 148
- Mouth river, Double . 156
- Movinges island . 223
- Mozambique harbour . 263
- Mpaka river . 163
- Mpandaji, Ras . 292
- Mpandaji village . 292
- Mpandi bay . 165
- Mpandi river . 165
- Mpanga-panga, Mwamba . 300
- Mpara hill . 323
- Mpatana river . 172
- Mpoleni hill . 162
- Mpotshotshe hill . 165
- Mpovi reef . 326
- Mpwa reef . 425
- Mquango, Mto . 306
- Mrima mountain . 412, 423
- Msala:
  - Channel . 342
  - Mouth . 334
  - Village . 334
- Msamgamku, Ras . 308
  - Light . 309
- Msange, Cabo . 293
- Msangi, Ras . 293
- Msaro, Restinga Mwamba . 295
- Msasana bay . 360
  - Anchorage . 361
- Msasana village . 361
- Msasani, *see* Msasana
- Msembasi, Mto . 420
- Msemo point . 310
  - Beacons . 310
- Msemo spit . 310
  - Beacon . 310
- Mshanga, Ilha . 295
- Mshingwi reef, anchorage . 363
- Msimbasi bay . 354
- Msimbati:
  - Channel . 307
  - Ras . 308
- Msimbazi, Mto . 420
- Mso bay, beacons . 324
- Mso, Ras . 324
- Msomene village . 336
- Msuaji reef . 331
- Msuka bay . 408
  - Anchorage, directions . 408
- Mtangani inlet . 409
- Mtanganyiko, Mto . 446
- Mtanganyiko village . 446
- Mtangata:
  - Bay . 411
  - Creek . 411
  - Ras . 410
  - Reef, beacon . 411
- Mtepwzi village . 312
- Mto, *see* proper name
- Mtoni, Ras . 475
- Mtoni village . 386
- Mtoti hills . 345

Page

- Mtu, Kipwa . 424
- Mtumbo village . 321
- Mtundo:
  - Island . 294
  - Mwamba . 299
  - Pass . 298
    - anchorage . 299
    - directions . 299
- Mtwana shoals . 376
  - Light-buoy . 376
- Mtwapa, Mto, depths . 444
- Mtwara:
  - Harbour . 310–312
    - anchorage . 311
    - beacons . 310
    - buoyage . 310
    - directions . 311
    - port facilities . 311
    - tidal streams . 311
  - Town . 311
- Muacula, Ponta . 263
- Muakula, Ponta . 263
- Muanculo, Baía de . 274
- Muanange, Rio . 246
- Mucalanga, Baixo . 261
- Muchelia, Monte de . 262
- Muchelia village . 262
- Mucombo, Ponta . 195
- Mucoque light . 221
- Mudge:
  - Point . 103
  - Reef . 261
- Mueve, Baixos de . 282
- Mueza creek . 435
- Mugongo, Mlango . 322
- Muhaji channel . 463
- Muhesa, Ras . 369
  - Beacon . 370
  - Signal station . 371
- Muítune, Baixo . 288
- Muizenberg mountain . 97
- Muizenberg resort . 98
- Mujaca:
  - Ilha . 286
    - light, signal station . 286
  - Shoal . 287
- Mumunuana, Pedra . 284
- Mundini, Ras . 425
  - Beacon . 425
- Mundo, Kilima . 305
- Mundomonho, Rio . 262
- Munghia village . 487
- Mungu, Mwamba Kisanga . 295
- Muni patches . 343
- Munrose bay . 113
- Murder hill . 475
- Murengulo, Banco do . 265
  - Beacon . 265
- Murogo reef . 379
- Murot, Collina . 496
- Murraça . 241
- Murray's bay, landing . 183
- Murundo, Ras . 340
- Muselo, Rio (Quelimane to Macuse) 246, 248
- Muselo, Rio (Rio Zambeze delta) . 235
- Mushroom rocks . 314
- Mussibarinde, Baixo . 260
- Mutaboa, Ponta . 262

Page
Mutine Baixo 282
Mutirrane, Banco de 254
Mutirrane, Ilha 254
Mutuaranimi, Praia de . . . 250
Mvita 442
Mwa Kisenge, Ras 429
  Light 437
Mwackema river 429
Mwamba, *see* proper name
Mwambamku :
  Ras 347
  Reef 347
Mwambani bay 411
Mwambi, Mto 305
Mwanamkaya reef 327
Mwanakombo, Mto 381
Mwana-wa-Mwana 381
  Light 381
Mwanda, Ras 381
  Buoy 383
Mwagotini :
  Lagoon 363
  Village 363
Mwania village 315
Mwanza 360
Mwemba islet 392
Mwera, Mto 374
Mwezi reef 423
Myangi, Fungu 316
Mzimili, Ras 435
  Light 437
Mzimpunzi river 169
Mzinga, Ras 318
Mzungu bay 320
  Anchorage 320
Mzungu islet, Chaka . . . 464

N'Jovo, Ilha 257
N'tabende hill 192
Naagh river 155
Naarenque, Ponta 272
  Light 273
Naburi, Rio 256
Nacala, Porto de . . . 273–275
  Anchorages 275
  Beacons, buoys 274
  Depths 273
  Lights 273
  Pilots 275
  Tidal streams. 275
Nacalaua village 254
Nacole, Baixo de 283
Nacuxa, Ponta 273
Nahoon point 150
Nahoon river 154
Nakitumbe islet 307
Namacoto, Punta 257
Namadaro, Rio 283
Namaete, Baixo 260
Namalungo, Ponta 260
  Light 260
Namarrimela, Rio 262
Nameguo :
  Fungu 292
  Pass 292
    anchorages 292
Namelala, Baía de 274

Page
Namelungue shoal 262
Namerrumo, Ponta 247
  Light 247
Namezaco, Baixo 261
Namgaru, Mto 319
Namtamwa, Fungu 319
Namuali, Baixo. 259
Namuaxi, Ponta 274
Nando, Ras 316
  Lights 316
Nandoa 246
Nanga, Mto 321
Nangamba, Ponta 284
Nangata, Ponta. 276
Nankivell rock 381
Nanqua's peak 141
Nantapa, Baixo. 259
Nanzaco, Baixo. 261
Napenja, Ponta. 271
Nasunga, Ras 304
Natal :
  Cape 177
    life-saving 177
    lights. 177
    signal station 177
  Province 5–6
    general remarks 5
    physical features. . . . 6
    ports 6
    products 6
  Road 178
    anchorage 179
    beacon 178
    light 178
Naueia, Ponta 278
Ncera river 148
Ndahi mouth 334
Ndege, Ras 348
Ndumbo, Ras 329
Ndunde village 330
Nebelele river 159
Needles point 118
Negro, Baía del. 503
Neill peak. 189
Nenumba, Ras 290
New bay 103
Newhaven 121
Ngadhla river 159
Ngai, Isola 473
Ngedu mouth 334
Ngelema bay 399
Ngoma river 160
Ngombeni Shamba 339
Ngome reefs, Mamba 381
Ngomeni, Ras 452
Ngumbe Sukani, Ras 321
Ngumi, Isola 474
Nguu Tatu 430
Ngwali village 312
Nhamacade, Ponta 232
Nhamiara :
  Ponta, light 236
  Rio 236
Nhiendgi 276
Nhlabane river 189
Nhlabane rock 189
Nhlange lake 194
Niamembe islet 374
Nicota, Banco de 254

Page
Nicota, Ponta 254
Niguro, Ras 293
Nihlayane river 162
Nimrod rock 99
Nimu village 491
Niororo island 343
  Anchorage 343
Nisus, Port 322
Niule reef 413
  Beacons 413
Niuni islet (Mocímboa) . . . 294
Niuni islet, Kero 291
Niuni, Passagem de (Mocímboa) . 294
Niuni, pass, Kero 292
Njao gap 407
Njao island 406
Nkoma, Ras 446
Nkunumbi, Mlango 462
Nkunumbi village 462
Noah's Ark 99
Nocekedwa river 160
Noetzie river 121
Nogàl, Wadi 504
  Anchorage 504
  Aspect 504
Nondo bay 319
Nondo, Ras 298
Nongerungo, Ras 316
Nonoti river 185
Noorskloof point 128
Nora, Ilha do 245
Nord, Passo (Chisimaio) . 478, 480
Nord, Scoglio 501
Norte, Banco do (Mozambique) . 265
Norte, Banco do (Rio Limpopo) . 211
Norte, Canal do (Antonio Enes) . 258
  Buoyage 258
Norte, Canal do (Lourenço Marques) 199
Norte, Canal do (Moçambique) . 266
  Buoyage 267
Norte, Canal do (Porto do Ibo) . 288
Norte, Passagem do . . . 201
North Breakwater sandbank . 225
North Channel (Ilha Chiloane) . 225
North Fanjove island . . . 347
North Lion's Paw 90
North Mafia channel . . . 343
North Middle bank . . . 465
North pass (Mto Kilifi) . . . 445
North pass (Patta bay) . . . 466
North patch (Bird islands) . . 135
North point (Rio Sangage) . . 260
North Ras Domoni . . . 397
North reef (Dar es Salaam) . . 355
  Light 357
North reef (Mto Kilifi) . . . 444
North reef (Malindi) . . . 450
North Sand bluff 174
North Shepstone village . . 174
Northumberland point . . . 108
Nouvela, Monte 210
Nqabara point 160
Nqabara river 160
Nqabarana river 160
Nqabe river 160
Nqakaqa river 162
Nqawara river 158
Ntafufu river 169

Page
Nthlonyane river 162
Nunge, Ras 363
Nunguruku hill 327
Nungwi, Ras 380
  Current 380
  Light 380
Nungwi village 380
Nuni, Mlima 315
Nütze river 121
Nxaxo river 158
Nyali bridge 441
Nyama, Fungu 413
  Beacons 413
Nyama knoll 408
Nyamaku, Ras 410
Nyandi village 318
Nyange reef 377
Nyasa, Lake 238
Nymphe shoal 314
Nyuni:
  Islet (Kilwa Kivinje) . . . 332
  Islet (Mocimboa) 294
  Pass (Kilwa Kivinje) . . . 331
Nyuni islet, Kero 291
Nyuni, Passagem de Kero . . 292

Oatland point 96
Obbia:
  Anchorages 501
  Beacon 501
  Current 501
  Light 501
  Town 502
Obelisk point, Inner . . . 118
Obelisk point, Outer . . . 118
Oboie village 484
Observation point 395
Ochre hill 192
Oeste, Canal do 245
Ogaden, Ras 475
Okambara reef 330
Okuto reef 338
Okuza island 333
  Anchorage 333
Olenghe range 218
  Beacon 218
Olifant's point 93
Olifant's Bosch point . . . 93
Olifant's Zitzikama 4
Olinda, Canal da 245
Olinda, Ponta da 243
Onifuconiculo village . . . 270
Onlugune, Ponta 271
  Light 271
Onrust berg 103
Onziuani cliff 273
Oquera, Ponta 274
Ord point 232
Oriale village 490
Oscar hill, King 192
Osman mosque, Sheik . . . 488
Osman Gor mosque . . . 488
Oude Schip 91
Ouro:
  Monte do 195
  Ponta do 195
    light 195

Page
Outeniqua range . . 115, 123
Outer Blinder reef . . . 108
Outer Obelisk point . . . 118
Outer Makatumbe island . . 353
Outer Sinda island . . . 352
Outer Tambare patch . . 377
Owen barrier 476
Owen channel 402
  Buoys 402
  Directions 402
Owyombo, Mto 448
Oxelo, Ponta 278
Oyster Blinders 100
  Beacon 100
Ozi:
  Mto 455
    anchorage 455
    beacon 455
    light 455
  Reefs 455

Paarden island 118
Pabula, Ponta 289
Pactolus, Port 322
Padrone, Cape 141
Paivo Manso shoal . . . 198
Paji village 408
Pale hill 381
Palm hill 339
Palma, Porto, *see* Tunghi bay
Palma village 303
Palmiet:
  Hill 145
  River 103
  Valley 105
Pamamba shoals 453
Paman, Cape 308
Pampani village 421
Pamunda islets 374
Panani islet 396
Pandawi cliff 320
Pangane, Ponta 289
Pangane reef 290
Pangani:
  Bay 369–372
    anchorage 371
    approaches 370
    aspect 369
    dangers 370
    signal station 371
  Falls (Mto Pangani) . . . 372
  Falls (Mto Rufiji) 366
  Mto 370
    above the town 371
    anchorage 371
    beacons 370
    buoys 370
    depths 370
    directions 371
  Town 371
Pangavini islet 361
Pange reef 378
Pani Mkumbi 421
Pansa island 396
Pantalon reef 290
Pantaloon shoal (P. Amelia) . 282
Pantaloon shoals (P. Matirre) . 247

Page
Panza island 396
Pão, Monte 264
Paquissanga, Baixos de . . 283
Parapato hill 259
  Signal station 259
Parcel, *see* proper name
Partridge point 95
Pasi islet 405
Passagem, *see* proper name
Passages 38, 39
Passo, *see* proper name
Patos kop 148
Patta:
  Bay 465
    anchorage 466
    depths 465
    directions 466
  Cliffs 462
  Island 462
  Middle cliffs 462
  Village 463
Paul's cove 168
Paulsberg 81
Pawi, Mto 322
Paza village 463
Pazarli ridge 465
Pazarli rocks 464
Peak rock 143
Peaks, Green 165
Pebane, Porto de . . . 248–250
  Beacons, buoys 250
  Depths 249
  Directions 250
Pedra, *see* proper name
Pedra, Ponta de 223
Pedroso, Porto de Duarte . . 278
Peete inlet 373
Pelana hill 190
Pemba:
  Channel 393–394
    current 393
    general directions . 393–394
  Island of 394–398
    current 395
    general remarks . . . 394
  Knolls 407
  Point 312
Pemba-juu island . . . 346
Pembamnasi, Ras . . . 346
Pembe island 403
Penguin shoal (P. Amelia) . . 282
Penguin shoal (Mtundo pass) . 299
  Anchorage 299
Penisola, *see* proper name
Pequêve, Cabo 290
Perducchi, Torre 482
Peremji, Mto 360
Pescicani, Isola 476
Phantasmas, Baixo dos . . 223
Phoenix blinder, beacon . . 100
Phoenix shoal, buoy . . . 100
Pilar, Monte 278
Pilipi, Monte 254
Pillar reef 449
Pillar rock 476
Pilone, Scoglio 476
  Beacons 478
Pilotage 34
Pinda, Baixo de, current . . 276

Page
Pinda, light 276
Pinda village 276
Pinguim, Baixo 282
Pinnacle point (Takaungu creek) . 445
Pinnacle point (Fish bay) . . 112
Piramide, Isolotto . . . 495
  Beacon 495
Pisang river 122
Plettenberg bay 122
  Anchorage 123
Pochin beach 397
Poelela, Lagoa 212
Poiasi reef 331
Point, The 178
  Life-saving 184
  Signal station 180
  Wharves 182
    depths 182
Polana:
  Baixo da 204
  Canal da 204
    beacons 205
    light, light-buoys . 204, 205
Pollard shoal 300
Pombwe, Ras 330
Pombwe village 372
Poméne, Baía de 219
Pongwe, Mto 424
Pongwi village 392
Ponta, *see* proper name
Ponzi channel 300
Ponzi, Ponta 299
Porcos, Ilha dos 216
  Signal station 216
Porpoise rock 167
Port, *see* proper name
Port Alfred 143–144
Port Beaufort 111
Port Beaver 323
Port Boteler 466
Port Cockburn 402–404
  Channels 403–404
  Entrances 403
Port Durnford 188
  Anchorage 188
  Current 188
  Directions 188
  Light 188
Port Elizabeth . . . 133, 137, 138
  Anchorage 133
  Approaches 131, 132
    beacons 133
    light-and-bell buoy . . 133
  Climatic table 67
  Directions 136
  Harbour 137
    depths 137
    lights, fog signal . . . 137
    wharves 137, 138
  Life-saving 138
  Lights 133, 134
  Port facilities 138
  Radio station 139
  Tidal streams 134
Port George 404
  Anchorage 405
  Beacons 404
  Directions 406
  Entrances 405
Port Grovenor 172
Port Herald 242
Port Kilindini 435–438
  Anchorage 438
  Beacons 436
  Cables 438
  Climatic table 79
  Depths 437, 438
  Directions 439
  Lights, light-buoy . . 436, 437
  Port facilities 440
  Tidal streams 438
  Wharfage 437, 438
Port Kishi-Kashi 406
  Anchorage 406
Port Kuiyu 407
  Anchorage 407
Port Reitz 438–440
  Anchorage 438
  Tidal streams 438
Port St. John's 166–169
  Anchorage 167
  Aspect 166
  Current 168
  Light 167
Port Shepstone 174
  Life-saving 175
  Light 174
  Signal station 175
Port Tudor 443
  Beacon 443
Portela, Canal 229
  Depths 229
  Light-buoys 229
Porto, *see* proper name
Porto Belo 247
Ports available for under-water
    repairs . . . 511–513
Portuguese East Africa, *see*
    Moçambique
Portugueses, Canal do . . . 199
  Anchorages 199
Portugueses, Ilha dos 198
Potteberg range 110
Potoa village 384
Praía das Gazelas 244
Prata, Ponta 271
Prestgrave bank 463
Primeira, Ilhas das 252
Prince Edward island 2
Pringle bay 96
Protea banks 176
Puanculo shoal 263
Pudding hill 188
Pudding hill, Black 165
Puga-Puga, Ilha 257
Pumbavu islet 331
Puna hill 348
Puna point 348
Punga-punge reef 408
Pungue, Rio 228
  Above Beira 232
Pungume island 374
  Light 374
Pungume patches 374
  Anchorage 375
Pungutiachi islets 426
Pungutiayu island 426
Punta, *see* proper name

Page

- Puopo islet 383
  - Buoy 383
- Purahanya mouth 366
- Pwajuu reef 331
- Pwakuu reef 377
- Pwani ndongo 386
- Pweza reef 331

- Qolora river 157
- Qora river 159
- Quanzi, Baixos 261
- Quanzi shoal 263
- Quarantine 38
- Quartel light 199
- Quebrabasa rapids 239
- Quelimane town 246
- Quenera river 154
- Quifula, Ilha 290
- Quifinga, Ponta 269
- Quilaluia, Ilha 286
- Quiloa old town 325
- Quilúa:
  - Canal de 258
  - Rio 256
- Quinera river 154
- Quinga, Baixo 260
- Quinga village 260
- Quionga:
  - Bay 304
    - anchorage 304
    - buoys 305
    - creeks 305
  - Mto 305
  - Village 305
- Quipaco:
  - Baía de 284
  - Ilha 284
- Quipúa 262
- Quirambo, Ilha 287
- Quiriamacoma, Rio 288
- Quirimba, Ilhas 285
  - Current 285
  - Tidal streams 285
- Quirimisi, Ponta 286
- Quisiva, Ilha 284
- Quissanga:
  - Islet 291
    - anchorage 291
  - Mwamba 295
  - Ponta 286
- Quissangua village 270
- Quissangula, Ilha 270
- Quissicõ light 213
- Quissimajulo, Porto de . . . 271
  - Beacon, buoy 272
  - Depths, directions . . . 271, 272
- Quissindja, Ilheu 279
- Quissiquitxa, Ponta 279
- Quisumba, Ponta 264
- Quitxundulo, Ponta 261
- Quivolane village 262
- Quku river 156
- Quoin, Gunner's 104
  - Hill (Umtentu river) . . . 172
  - Point 105

Page

- Rabai:
  - Hill 443
  - Mission station 443
  - Range 443
- Rabai hill, Gran 488
- Radio stations open for public correspondence 35
- Rambler:
  - Canal 229
    - depths 229
    - light-buoys 229
  - Rock 99
- Rame head 164
- Raraga, Rio 248
- Ras, *see* proper name
- Rashid, Ras 426
- Rasini, Mto 453
- Ratos, Ilha dos 216
- Read's Monument rock . . . 132
- Recamba, Ilha 244
- Recife, Cape 130
  - Beacon 130
  - Light fog signal 130
- Recife hillock 130
- Red hill (Sikombe river) . . . 173
- Red hill (Tugela river) . . . 186
- Reef point, beacon 155
- Regulations:
  - Ports in Somalia 37
  - Simonstown dockyard . . . 38
  - Union of South Africa . . 36–37
  - Zanzibar Protectorate . . . 37
- Reitz, Port, *see* Port Reitz
- Relanzapo, Ponta 272
- Repairs 36
- Restinga, *see* proper name
- Ribeiro, Baixo 201
  - Light 201
- Ribunda, Mwamba 309
- Richardson knoll 225
- Ricoma, Mwamba 304
- Ridge, The 176
- Riet point 144
- Riet river 144
- Rio, *see* proper name
- Riy bank 131
- Roango bay 321
- Roango village 321
- Robben island 82
  - Anchorage 83
  - Life-saving 83
  - Light, fog signal 83
- Robhoek point 125
- Robinson dry dock 89
- Rocamba, Ilha 244
- Rock river, Blue 124
- Rockland point 96
- Rocky:
  - Bank 94
  - Islet 414
  - Patch 99
  - Point (Great Fish river) . . 146
- Roges, Monte 276
- Roggeveld Sneeux Bergen range 4
- Rokumbi, Fungu 319
- Rolas, Ilha das 289
  - Anchorage 289
  - Directions 289

Page
Roman rock (Cape Recife) . . 133
  Light-and-bell buoy . . 133
Roman rocks (False bay) . . 99
  Light 100
Romero, Ponta 281
  Light 282
Rondebosch berg 127
Rongoni, Ras 353, 355
  Lights 355
Rongozi, Ras 324
  Buoy 325
Rongui, Ilha 300
Rongwi, Ilha 300
Rooi kop 93
Rose, Collina delle 469
Rose, Pico delle. 469
Rotonda, Collina 475
  Beacon 478
Rovine, Punta 494
Rozhes, Monte 276
Rozier:
  Bank 469
  Rocks 469
Rozier's Sixes 469
Ruangale reef 326
Rufane river 144
Rufiji, Mto 333–337
  Above the delta . . . 336, 337
  Current. 336
  Delta 333–336
  Tidal streams. 336
Rufiji-ya-Wake, Mto 333
Ruhaha, Mlima 320
Rukindo mountain 412
Rukyira:
  Bar 327
  Bay 326
  Mwamba 323, 324
  Spit 374
Rungi, Ras 315
Ruo, Rio 242
Ruvu bay. 319
Ruvu, Mto 364
Ruvúma:
  Bay 305
    anchorages 306
    tidal streams 306
  Cape 305
  Mto 306
Ruvura, Ras (Kilwa Kisiwani) . 324
Ruvura, Ras (Mnasi bay) . . 307

NOTE.—All names prefixed by Santa, Santo, São or St., will be found in alphabetical order after the letter S.

S. Antonio, Baixo de . . . 259
S. Barbara military station. . 260
S. Blaize, Cape 112
  Climatic table 66
  Life-saving 113
  Light, fog signal . . . 113
  Signal station 113
S. Carolina, Ilha 222
  Anchorages 223
  Beacon 222
  Light 222
S. Croix island, anchorage . . 133
Page
S. Francis:
  Bay 126
  Cape 127
    aspect 126
    directions 127
    light, fog signal . . . 126
    signal station 126
S. Gonçalo, Baixo de 287
  Beacon 287
S. João, Baixo de 195
S. João fort 287
S. João, Ponta 265
  Beacon 265
S. John reef 169
S. John's Port, *see* Port S. John's
S. John's Gates 166
S. John's river 166
S. Lazarus bank 286
S. Lourenço:
  Banco de 266
  Ilheu de 266
S. Lucia:
  Bay 190
    anchorage 190
  Cape 190
    light 190
  Lake 190
S. Maria:
  Baixo 196
  Cabo de 195
S. Mary's hill 192
S. Mungo point 107
S. Sebastian:
  Bay, anchorage 110
  Point 110
S. Sebastiao:
  Cabo, light 219, 220
  Canal da Fortaleza de . . 266
  Fortaleza de 266
Saadani village 367
Sabaki, Mto 449
Sabda Badda 484
Sabi river 224
Sacamulo, Ponta 273
  Light 273
Sacasse, Lago 234
Sadani village 367
Sahaja, Ponta 277
Saíde Ali, Ponta 281
  Light 282
Sail rock 448
Salale village 335
Salamo, Lac 474
Salim bank 339, 342
  Buoy 342
Salisbury island. 182
  Wharf 183
Salt river (Plettenberg bay) . 124
Salt river (Table bay) . . . 84
Salt Vlie bay 143
Salt Vlie point 143
Samadudu:
  Mwamba 304
  Ras 304
Samanga Fungu, Ras . . . 329
Samanga village 329
Sambweni beach 428
Sambweni reef 428

Page
Samepinguira, Ponta . . . 242
  Beacon . . . 243
Sancul:
  Banco de . . . 265
  Ponta . . . 261
  Sands . . . 265
Sand cay . . . 294
Sanders rock . . . 331
Sand Kop Trig . . . 150
Sandknoll point . . . 105
Sandown bay . . . 103
Sandy bay . . . 91
Sandy point (Bowker's bay) . . . 158
Sandy point (Danger point) . . . 105
Sangage:
  Baía de . . . 260
    depths . . . 260
  Baixo . . . 259
  Rio . . . 259
    light . . . 259
Sangarungu:
  Harbour, anchorage . . . 322
  Ras . . . 322
Sange islet . . . 367
Sanhute, Rio . . . 270
Sanji-ya-Kati island . . . 322
Sanji-ya-Majoma village . . . 323
Santa, *see* under S.
Santo, *see* under S.
São, *see* under S.
Sardinia bay . . . 129
Saunders rocks . . . 90
Saua-Saua village . . . 270
Save, Rio . . . 224
Saxon reef . . . 108
Scebéli district, Wadi . . . 490
Schaapkops river . . . 116
Schip, Oude . . . 91
Schmalcalder chain . . . 475
Schmalcalder's Sixes . . . 475
Schoenmakerskop . . . 130
Scholtz Kraal . . . 126
Scianguani:
  Le Secche . . . 469
  Ras . . . 469
Scillani, Isolotti . . . 483, 485
Scillani Nord, Isolotto . . . 485
Scillani Sud, Isolotto . . . 485
  Beacon . . . 485
Scingani . . . 493
Scoglio, *see* proper name
Scottsburg . . . 175
Sea point . . . 85
Sea Park village . . . 175
Seagull shoal . . . 385
  Light-buoy . . . 385
Seal:
  Cape, light . . . 122
  Island . . . 113
  Islet (Bird islands) . . . 134
  Islet (False bay) . . . 3, 98
    beacons . . . 98
  Point . . . 126
    light, fog signal . . . 126
    signal station . . . 126
Secca, *see* proper name
Second Beach bay . . . 166
Seekoe point . . . 127
Seekoe river . . . 127

Page
Sef Tweel . . . 503
Sefo reef . . . 342
  Beacon . . . 342
Selela, Ponta . . . 260
Seli-Seli rocks . . . 292
Sena, Ilha de . . . 264
Sena town . . . 241
Senawe range . . . 443
Sencar, Ilha . . . 286
Serani, Ras . . . 429
  Lights . . . 432
  Signal station . . . 432
Serissa, Ponta . . . 279
Serpenti, Isola, light . . . 476
Serra, *see* proper name
Serra, Baixo . . . 201
Sete Paus, Ilha dos . . . 264
Seymour bank . . . 458
Shaka, Ras . . . 453
Shamba, Port . . . 474
Shangani:
  Mwamba . . . 309
  Ras . . . 377
    light . . . 377
  Shoal, buoy . . . 309
Sharp peak (Simons bay) . . . 96
  Compass adjustment . . . 102
Sharp peak (E. London) . . . 155
Shearwater patches . . . 382
Shebeli district, Wadi . . . 490
Sheik Osman mosque . . . 488
Shella:
  Light . . . 458
  Signal station . . . 458
  Village . . . 458
Shelley bay . . . 130
Shepstone, Port, *see* Port Shepstone
Shepstone village, North . . . 174
Sherwood:
  Banks . . . 469
  Point . . . 469
  Reef . . . 469
  Sands . . . 469
Sherwood's Sixes . . . 469
Shimanzi . . . 436
Shimba range . . . 430
Ship:
  Channel . . . 413
    buoyage . . . 413
    depths . . . 413, 414
  Head . . . 118
  Rock . . . 143
  Shoals . . . 426
Shiré, Rio . . . 241, 242
  Health . . . 240
Shivala cliffs . . . 219
Shixini point . . . 159
Shixini river . . . 159
Shongoni, Ras . . . 462
Shuka, Ras . . . 315
  Light . . . 315
Shundo, Mwamba . . . 419
Shungilanzi islet . . . 425
Shungu bay . . . 346
Shungu Bweni Mto . . . 346
Shungu-mbili:
  Island, buoy . . . 342, 343
  Pass . . . 343

Page
Sif, Ras 492
Sifad Add 494
Signals:
  Immigration flag . . . 28
  Lloyd's reports . . . 28
  Vessels carrying explosives . 28
  Vessels inconvenienced by searchlights . . . 28
Sii island 424
Sikombe river 173
Silva, Ilha 252
Silva, Ilha Manuel da . . . 287
Simambaya island . . . 468
Simaya island 332
Simba hill 443
Simba, Mlima 470
Simba Uranga:
  Mouth, directions . . . 334
  Ras 335
Simbandona branch . . . 334
Simons bay 99
  Anchorage 101
  Buoys 100
  Compass adjustment . . 102
  Dangers in Approach . . 99
    beacon 100
  Directions 101
  Dockyard 100
    beacons, lights . . . 100
  Life-saving 102
  Light 100
  Port facilities 102
  Signal station 101
Simonsberg 102
Simonstown 102
  Dockyard regulations . . 99
  Repairs 102
Simovongo hill 470
Simplicio, Baixo de . . . 244
Simuco, Porto de 278
  Anchorage 278
  Directions 279
Sinais, Rio dos Bons, *see* Bons Sinais, Rio dos
Sinangwana river 165
Sinda island, Inner . . . 352
Sinda island, Outer . . . 352
Sindassi, Ras 487
Singino hill 323, 327
Single Tree hill 450
Sinkwasi river 185
Sinkwazi river 185
Sisini creek 408
Sisini village 408
Sisters rocks, Three . . . 145
Sito, Ponta 284
Siwi:
  Bank 465
  Point 463
  Spit 465, 467
  Village 463
Sixes:
  Rozier's 469
  Schmalcalder's 475
  Sherwood's 469
Siyu:
  Channel 463
  Village 463
Skiet kop 147

Page
Slang bay 125
Slang Kop point 93
  Life-saving 93
  Light 93
  Local Magnetic Anomaly . . 92
Slangrivier 126
Smitswinkel bay 95
Smyth islet 476
Snag rocks 157
Sofala:
  Baía de 227
    buoy 227
    current 19
    light 227
  Banco de 226
  Porto de 227
    depths 227
Sofia, Monte 279
Somalia:
  General remarks . . . 14–15
  Physical features 15
  Ports 15
  Products 15
Sombo village 237
Sombreiro, Ilha 270
Somerset West town . . . 97
Songa Manara island . . . 321
Songo Songo island . . . 331
  Anchorage 331
Sordwana:
  Point 193
  River 193
  Road 193
    anchorage 193
South Africa, Union of, *see* Union of South Africa
South Arm (Victoria basin) . . 87
South Channel (Ilha Chiloane) . 225
South Head reef 370
South Lion's Paw 90
South Mafia channel . . 329, 333
South Middle bank 465
South Pass 466
South point (Rio Sangage) . . 260
South Ras Domini 395
South reef (Dar es Salaam) . . 355
South reef (Mto Kilifi) . . . 444
South Sand bluff 172
  Light 172
South-east rocks 118
Southern channel 414
Southern pass 375–379
  Directions 378
  Lights . . . 375, 377, 378
  Light-buoys 376
Southport village 175
South-west reefs 94
Spaniard rock, The 96
Spit beacon (Knysna) . . . 119
Spitzkop 118
St., *see* under S.
Staffetta, Secca 494
Stag bay 135
Stag island 134
Stalwart point 146
Standard and Summer times . 36
Stanford cove 103
Stapylton hills 284
Steamer rock 195

Page
Steinbok island, beacon 118
Stil baai 110
Still bay 111
  Anchorage 111
Stille bay 110
Stinkhoutberg peak 124
Stony point 158
Stork passage 450
Stork patch 426
Storm point 124
Storms river 124
Strand 97
Strutts reef 137
Struys:
  Bay 108
    anchorage 109
    current 109
    directions 109
  Point 108
    beacon 108
Sturrock graving dock 89
Submarine cables 30–31
Sud, Scoglio 501
Sudi, Mto 313–314
  Anchorage 314
  Beacon, buoys 314
  Directions 314
  Tidal streams 314
Sudi village 315
Sugar Loaf hill 190
Sugar Loaf rock 166
Sukane, Ras Ngumbe 321
Sukuti reef 347
  Anchorage 347
Sul, Banco do (Rio Limpopo) 211
Sul, Banco do (Moçambique) 264
Sul, Baixo do 211
Sul, Canal do (Antonio Énes) 258
Sul, Canal do (L. Marques) 198
  Light-buoys 198
  Tidal streams 202
Sul, Canal do (Moçambique) 266
Sul, Canal do (P. do Ibo) 288
  Buoyage 288
Sul, Passagem do 202
Sulimane, Ponta 238
Sumi islet 375
Sumwago islet 396
Suna, Ilha 294
Suna, Passagem de 294
Sundays river 132
Suninga arm 335
Suninga island 335
Sunwich Port village 175
Swafo, Mwamba 305
Swafo, Ras 304
Swart river 117
Swa-swa, Ras 314
  Buoy 314
Sylph:
  Channel 466
  Rock 465
Sylvia:
  Ridge 218
  Shoal 218

Page
Table bay:
  Anchorage 85, 86
  Buoyage 85
  Currents 85
  Directions 86
  Dry docks 89
  Harbour 87–90
    depths 87, 88
    lights, fog signals 85
    port facilities 89, 90
    signal station 87
Table mountain 81
Tabor, Mount, mission station 191
Taka, Ras 462
Takaungu:
  Creek 445
    anchorage 445
  Pass 445
  Town 445
Tali islets 376
Tambare reef 377
Tambare patch, Outer 377
Tamborani village 411
Tambula, Mwamba 294
Tambúzi:
  Ilha, light 294
  Passagem de 293
    depths 294
Tana, Mto 453
Tandanhangue, Canal da 288
Tane beacon 195
Tanga:
  Bay 412–419
    anchorage 418
    aspect 412
    beacons 413
    buoyage 413, 414
    channels 413, 414
    directions 418
    lights 416
    signal station 415
  Inner harbour 415–419
    beacons 416–417
    climatic table 78
    directions 418
    lights, light-buoys 416
    port facilities 418
    signals 417, 418
  Island 416
  Town 416
Tangalane, Banco de 244
Tangalane, Ponta 243
Tanganyika Territory:
  General remarks 9–10
  Physical features 10
  Ports 10
  Products 10
  Railways 11
Tangila summit 430
Tanina, Porto 474
Tari, Rio 284
Tawangu, Mwamba 464
Tebo, Ilheu 278
Techantia reef 290
Tecomadji, Ilha 302
Tegadi, Isola 473
Tegungo, Rio 249
Tekomaji island 302
Telegraph point 436

Page

- Tembe, Rio 207
- Tenedos shoal 187
- Tenewe, Islets of 456
  - Anchorage, directions . . 456
- Tenewiati, Ras 456
- Tengale reef 411
- Ternate, Secca 498
- Tete. 239
- Thenina island 474
- Thenina port 474
- Thornton river 233
- Three Anchor Bay 90
- Three Islets 402
- Three Sisters rocks . . . 143, 145
- Thumb peak 123
- Thunderbolt reef 131
- Thys bay 126
- Thys point 126
- Tikwiri, Ras 326
- Tidal Streams 27
- Timbué, Ilha 233
  - Light 233
- Timeball hill 152
- Tirene:
  - Bay 339
    - anchorage, buoys . . . 340
    - directions 340
    - tidal streams 340
  - Reef, buoy 339, 340
  - Village 340
- Titange village 336
- Tocorro, Cabo 250
- Todobatan hill, beacon . . . 489
- Tomba, Isolotti 476
- Tongaat bluff 185
- Tongaat river 185
- Tongone, Fungu 411
- Tongwe peak 369
- Torre, *see* proper name
- Torre village, El 487
- Torres, Ponta 196
- Toto island, Manda 462
- Touws rivier 116
- Tovai:
  - Banks 474
  - Island 473
  - Mto 474
  - Village 473
- Tres Marias, Ponta das . . . 200
  - Beacon 200
- Trevis fort 488
- Trompskop 111
- Tshontini river 163
- Tsitsikama point 123
- Tsitsikama river 125
- Tudor, Port, *see* Port Tudor
- Tugela bluff 186
- Tugela river 186
- Tula:
  - Banks 473
  - Island 473
  - Porto 473
  - Village 473
- Tumbatu island 381
- Tundaua, Ras 399
- Tundu rock 407
- Tunghi bay 301
  - Anchorage 302
  - Buoys 302

Page

- Tunghi bay—*contd.*
  - Directions 303
  - Light 302
  - Signal station 302
  - Tidal streams 302
- Tungwe, Ras, beacon, buoy . 405
- Tungwi, Ras 405
- Tutia reef 338
- Twana creek 334
- Twana, Ras 334
- Twelve Apostles, The . . . 82
- Twins, The 396
- Txibange beacon 212

- Uamize:
  - Ilha 298
  - Pass 299
    - directions 301
- Uarsciech:
  - Anchorages 494, 495
    - aspect 494
    - beacons 495
    - directions 495
  - Punta 495
  - Secca 494
  - Village 495
- Ubazi river 172
- Ubombo head 164
- Ubomoo head 164
- Ucáia, Ponta 287
- Udoe hill 366
- Udwesa forest 160
- Udwesa point 160
- Uerega, Ras 492
- Uginga arm 334
- Uifondo, Ponta 280
  - Light 280
- Uilkraal river 105
- Uiuia, Ponta 270
- Ukamba reef 346
- Ukanga island 374
- Ukatani reef 363
- Ukatani village 363
- Ukenjwe, Ras 404
- Ukombe islet, buoy 376
- Ukombe, Mwamba 375
- Ukombi islet 375
- Ukove, Ras 462
- Ukungwi, Ras 404
- Ulenge:
  - Island 414
    - lights 415
  - Reef 414
    - light-buoy 415
- Ulu, Raz 292
- Ulué, Rocha 195
- Umba, Mto 423
- Umbeluzi, Rio 207
- Umdoni house 175
- Umdumbi river 164
- Umgababa river 176
- Umgazana river 165
- Umgazi bay 165
- Umgazi river 166
- Umgeni river 178
- Umgolo river 169
- Umgovuna river 187

Page

- Umhlali river 185
- Umhlanga river 185
- Umhlatuzana river 188
- Umhlatuzi bluff 189
- Umhlatuzi lagoon 189
- Umhlengeni river 174
- Umhloti river 185
- Umhlutani river 185
- Umkomaas river 175
- Umkomaas village 176
- Umkwani river 172
- Umlalazi river 187
- Umlazi river 177
- Umnenga river 163
- Umpahlana river 173
- Umpambinyoni river 175
- Umpenjati river 174
- Umsikabe river 172
- Umtakatyi river 164
- Umtamar shoal 316
- Umtamfuna river 158
- Umtamvuna river 1, 173
- Umtata river (East London) 147
- Umtata river 163
- Umtentu river 172
- Umtentweni village 175
- Umtilwane river 158
- Umtsikaba river 172
- Umtwalumi river 175
- Umtwendwe river 156
- Umvoti river 185
- Umyameni river 173
- Umzamba river 173
- Umzimbazi river 176
- Umzimhlava river 169
- Umzimkulu river 174
- Umzimpunzi river 169
- Umzinto bay 175
- Umzinto river 175
- Umzumbi river 175
- Umzumbi village 175
- Ungama bay 453
- Unga-wa-ngoma, Ras 403
- Ungoye mountain 187
- Unguja 390
- Union of South Africa:
  - Communications 3
  - General remarks 2
  - Guano 3
  - Shipping 3
  - Trade and produce 2
- Upanga, Mto 355
- Upanga, Ras 355
- Upembe passage 395
- Upembe, Ras 395
- Uranga mouth, Simba 334
- Urua, Ras 392
- Usambara mountains 369
- Ushongu, Fungu 368
- Usimbe, Mto 334
- Usimbe village 336
- Uso wa Membe, Ras 380
  - Buoy 383
  - Light 384
- Utagite mouth 330
- Utanha, Ilha 230
- Utanhe, Ilha 230
- Uta-wa-limani reef 402
- Utende rock 458

Page

- Utete village 337
- Utondwe, Mto 366
- Utondwe, Ras 366
- Utuco, Ponta 273
- Uvinje:
  - Gap, beacons 405
  - Island 404
  - Mto 427
- Uvongo:
  - Cliff 174
  - River 174
  - Village 174
- Uwemba hill 381
- Uzi island 373

- Vaarkens cove 113
- Vacca, Cape 112
- Val rock 331
- Van Staadens range 124
- Van Staadens river 128
- Vanga, Hori 423
- Vanga town 423
- Vasco da Gama peak 93
- Vasco da Gama's pillar 449
  - Light 449
- Vasconcelas e Sa, Farol de 197
- Vedette hill 187
- Velhaco, Porto 271
- Veloso, Baía de Fernão 272–273
- Verde, Isolotto 476
- Vermelha, Ponta 201
  - Beacons 201
  - Lights 200
  - Signal station 205
- Vermelha, Ponta (Mocímboa) 293
- Vicente 240
- Victoria:
  - Basin 87
    - berths 87–88
    - depths 87–88
    - lights 87
  - Bay 116
  - Falls 238
- Vidal:
  - Bank 463
  - Cape 192
  - Ledge 473
- Vikuarini, Mto 428
- Vikunguni island 402
- Vila Bocage 239
- Vila de João Belo 211
- Vilhena light 243
- Vis Kop 155
- Volturno, Secca 496
- Vulcan rock 91
- Vulture bank 343
- Vuma island 474
- Vumba islet 299
- Vundwe island 373
- Vyumbani reefs 347

- Wadi, *see* proper name
- Wadiazi, Mwamba 291
- Waga, Mwamba 426
- Walker bay 103

- Walker point 117
- Wall point 124
- Wamba, Mwamba . . . 413, 419
  - Beacon 419
- Wambi, Ras 314
- Wami, Mto 366
- Wami patches 367
- Wamizi island 298
- Wango, Fungu 330
- Wango, Ras 329
- Wangwa-wa-ngoma, Ras . . 403
- Wanuni, Mwamba 292
- Warner Beach village . . . 177
- Wasa village 448
- Wasin:
  - Channel . . . 424–427
    - anchorage 426
    - current 426
    - directions 427
    - eastern approach . . . 426
    - South-western approach . 424
  - Island 425
    - beacon 425
  - Ras 425
- Waso village 362
- Waterfall bluff 170
- Waterloo bay 146
  - Anchorage 146
- Weather, Coastal:
  - Moçambique 49–54
  - Somalia 60–63
  - Tanganyika and Kenya . 54–60
  - Union of South Africa . 39–49
- Werro village 421
- Wesha port 399
  - Beacons 400
- West Bank 154
- West Ferry point 355
- West Gate 166
- West rock 135
- Western pass 379
  - Directions 380
- Wete:
  - Creek 405
  - Harbour 405
    - anchorage 405
    - buoy beacons 405
- Whale:
  - Rock (Cape Seal) 122
  - Rock (Rame head) 164
  - Rock (Table bay) 83
- Whale Rock point 163
- Wharf rock 101
  - Buoy 101
- White point 126
- Whittle rock: 98
  - Beacons 98
  - Directions 98
  - Light-and-bell buoy . . . 98
- Wimbi reefs 428
- Winde:
  - Patches, buoy 366
  - Ras 365
  - Village 365
- Windi, Ras 365
- Witelbos 123
- Witte Els berg 123
- Witte Els river 125
- Witu 461
- Woody cape 132
- Wreck point 125
- Wright rock 382
- Wumi reef 342
- Wundwi island 373
- Wynberg 81

- Xara, Baixo do 223
- Xefina:
  - do Meio 200
  - Parcel da 200
  - Pequena, Ilha 209
  - Restinga da 200
    - Light 200
  - Grande, Ilha 200
  - Grande, Passagem de . . 201
- Xezine, Ilha 221
- Xora river 162

- Ya Vumba-Ganàna, Mto . . 482
- Yambe island 413
- Yambe reef 414
- Yambwa Ngome reefs . . . 384
- Yamkumbi, Ras 290
- Yandope village 346
- Yasin, Fungu 362
  - Anchorage 362
  - Beacon 362
- Yaya mouth 333
- Yaya village 334
- Yeketekambe, Ras 373
- Yimbo:
  - Mto 423
    - anchorage 424
  - Village 423
- Yombi island 396
- York point beacons . . . 91, 92
- York shoal 90
- Yuse, Rio 250
- Yuse village 251
- Yzervark point 111

- Zala reef 290
- Zambeze, Bocas do . . . 233, 234
  - Light 233
- Zambeze, Rio 238–242
  - Anchorage 240
  - Current 239
  - Delta 233
    - anchorage 235
    - aspect 233
    - directions 235
    - tidal streams 235
  - Health 240
  - High and low river . . . 239
- Zambezi river 238
- Zambia shoal 220
- Zanzibar:
  - Channel 350–351
    - current 350
    - general directions from eastward 351
    - general remarks 350
    - tidal streams 350

Page
Zanzibar—*contd.*
  Harbour 382–391
    anchorages 388
    climatic table 77
    depths 389
    directions for leaving harbour 391
    directions from northward . 387
    directions from southward . 378
    lights 389
    light-buoys 389
    northern approach . . 385
    pilots 388
    port facilities 396
    regulations 387
    southern approach . . 375
    western approach . . 379
  Island, general remarks . . 372
  Protectorate :
    general remarks . . 11–12
    physical features . . . 12
    products 12
    ports 12

Page
Zavora, Ponta 213
  Currents 213
  Light, signal station . . 213
Zeboma, Mwamba 453
Zeekoe point 127
Zewoyu, Mwamba 455
Zigi, Mto 415
Zingwi-Zingwi, Mto . . . 381
Zitzikamma point 123
Zitzikamma, Olifants . . . 4
Ziu Ziu, Rio 242
Ziwaiu, Mwamba 455
Zoetanysberg 105
Zout river (Kromkromma point). 124
Zout river (Marcus bay) . . 110
Zuani, Ponta 273
  Light 273
Zumbo 238
Zwart river 116
Zwartkop 81
Zwartkops river 132

PUBLICATIONS

# of the

HYDROGRAPHIC DEPARTMENT

A complete list of the Sailing Directions, Charts and other works published by the Hydrographic Department of the Admiralty, together with a list of Agents for their sale, is contained in the "Catalogue of Admiralty Charts and other Hydrographic publications," published annually.

The list of Agents, referred to above, and from whom this catalogue can be obtained, is also promulgated in Admiralty Notice to Mariners No. 2 of each year.

Printed in Great Britain under the authority of HER MAJESTY'S STATIONERY OFFICE
by Butler & Tanner Ltd., Frome and London.

Ps. 8980. Wt. 21904/H4189. 9/54. B. & T. Ltd. Gp. 460.

THE UNIVERSITY LIBRARY
UNIVERSITY OF CALIFORNIA, SANTA CRUZ

This book is due on the last **HOUR** stamped below.

30m-1,'69 (J5643s8) 2374—3A,1